ENVIRONMENTAL ASSESSMENT

For the Proposed Amendment to the

Green Mountain National Forest

Land and Resource Management Plan for

Threatened, Endangered, and Sensitive Species

January 2001

Table of Contents

List of Tables

List of Figures

Chapter 1 Purpose and Need for this Proposal

Forest Location and Description

The Green Mountain National Forest (GMNF) encompasses approximately 375,000 acres in southern and central Vermont in the Counties of Addison, Bennington, Rutland, Washington, Windham, and Windsor. This is roughly 6 percent of the total land in Vermont and 50 percent of all public lands in the State.

By 1905, historic logging and agricultural practices of the 1700 and 1800's removed the majority of the original forest on what is now the GMNF. As forest regrowth occurred, the Forest Service undertook active management, following the establishment of the GMNF in 1935, to improve forest and tree quality and diversity. Total standing timber volume on the Forest has steadily increased to the current levels, which likely exceed any levels since the arrival of European settlers.

About 334 wildlife species, 17 fish species, and over 400 vascular plant species inhabit the GMNF and are dependant on the habitat provided therein. There are no federally listed or proposed aquatic or plant species on or near the GMNF. No critical habitat for any federally listed threatened, endangered, or proposed species has been designated on the GMNF.

Decision To Be Made

The decision to be made is to determine what changes are needed in existing GMNF Land and Resource Management Plan (Forest Plan) standards and guidelines and monitoring requirements, based on new information regarding federally listed threatened and endangered (T&E) species, and Regional Forester's Sensitive Species (RFSS), found on or near the GMNF. The scope of the decision is confined to a reasonable range of alternatives aimed at amending the Forest Plan to respond to the new information as described in the purpose and need, and clarify direction for RFSS. Possible choices for addressing this new information include amending the Forest Plan as shown in the Proposed Action, amending it as shown in the alternatives, or not amending it at all. This Environmental Assessment (EA) analyzes and discloses the direct, indirect, and cumulative effects of five alternatives (the Proposed Action, the No Action Alternative, the Proposed Action with Conservation Measures, the Proposed Action with No Summer Timber Harvesting, and the Proposed Action with Conservation Measures and No Summer Timber Harvesting).

Purpose and Need

When new information or research findings become available regarding resources for which the Forest has a stewardship obligation, we are required to analyze the relationship of this information with the existing Forest Plan, and, if needed, amend our Forest Plan to keep it current and consistent.

New information concerning the federally endangered Indiana bat (*Myotis sodalis*) has emerged through consultation with the U.S. Department of Interior, Fish and Wildlife Service (FWS), which is presented in the programmatic Biological Assessment (BA) for T&E species on the GMNF (USDA 1999); in the Biological Opinion (BO) of the FWS for T&E species on the GMNF (USDI 2000); and all reference material used in the development of those documents. New information concerning

RFSS is presented in the updated RFSS list (USDA 2000a); updated policy direction contained within supplements to Forest Service Manual (FSM) 2670; a programmatic Biological Evaluation (BE) of the Forest Plan for conservation and management of RFSS (USDA 2000c), and all reference material used in the development of these documents.

As new information concerning Indiana bat and RFSS species has emerged, the need to amend the Forest Plan to include new or revised standards and guidelines, additional monitoring requirements, and updated RFSS direction has become evident. The requirements of the Biological Opinion (BO) minimize the incidental take of Indiana bat in the course of implementing the otherwise lawful management activities of the Forest Plan. Updated direction on RFSS is needed to eliminate any confusion regarding the Forest's continued commitment to conserve these species.

The purpose of this analysis, therefore, is to address the protection, maintenance and enhancement of habitat on the GMNF needed to ensure the continued existence of the federally endangered Indiana bat, and to address clarification of direction for RFSS. The analysis will

1. identify what changes are needed in the current Forest Plan standards and guidelines, monitoring requirements, and general direction as a result of this new information; and

2. determine the environmental effects of incorporating the new information, including the Terms and Conditions of the Biological Opinion, into the Forest Plan, in the form of a reasonable range of alternatives.

This analysis addresses revising or adding additional protection measures and management guidelines for federally listed endangered and threatened species to those already in the Forest Plan. This analysis does not constitute a reauthorization of the entire Forest Plan. The overall goals, objectives and direction of the Forest Plan would remain unchanged.

Proposed Action

The GMNF proposes to amend the 1987 Forest Plan by integrating the Terms and Conditions of the Biological Opinion into current Forest management direction. This would be done by revising two standards and guidelines (S&Gs) and adding 15 new S&Gs. Appendix E and the "Wildlife and Fish" S&G section would be reorganized and updated to reflect new RFSS information. The "Resource Objectives" section in chapter 4 and "Activities and Outputs to be Monitored" in appendix C would be modified by revising protection objectives for RFSS and monitoring requirements for Indiana bat and RFSS. The proposed changes are further documented in the "Alternatives Considered" chapter of this EA.

Background

U.S. Fish & Wildlife Service Consultation and Biological Opinion

In January of 1986, formal consultation with the FWS was completed for the newly developed GMNF Forest Plan. Two species were addressed: the American peregrine falcon and Indiana bat. At that time, the FWS determined that consultation was not required for the Indiana bat, as it was not known to occur on the GMNF.

Continuing research and inventory of T&E species, as well as refinement of our knowledge of these species' habitat requirements, prompted the GMNF to take another look at the potential effects of continued implementation of the existing Forest Plan. During the summer of 1999, the Forest prepared a BA evaluating the effects of ongoing management practices and anticipated implementation of the Forest Plan on six threatened, endangered or proposed for listing species. A majority of this new information related to Indiana bat was presented in the BA, dated August 27, 1999. On September 21, 1999 the GMNF requested that the FWS initiate formal consultation on the Forest Plan in an effort to assess potential adverse effects on the Indiana bat as a consequence of management activities on the GMNF.

As required under the Endangered Species Act of 1973 (ESA), the FWS reviewed the BA, and on February 16, 2000, issued a BO and conference report addressing the continued implementation of the Forest Plan. The BO specifically addressed GMNF management for the Indiana bat, and concurred with determinations for the other five species (American peregrine falcon, bald eagle, Eastern cougar, gray wolf and Canada lynx). This BO contains 17 specific actions (Terms and Conditions) the GMNF is required to implement that are designed to minimize the level of incidental take identified for the Indiana bat. These actions are divided into two time "categories": (i) actions throughout the year, and (ii) actions during the non-hibernation periods. The BO also contains a listing of discretionary activities, identified as Conservation Recommendations, that further conservation of this species. Incidental take is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing or collecting, or attempting to engage in any such conduct. A full listing of the Terms and Conditions and Conservation Recommendations can be found in the BO (USDI 2000).

The FWS concurred with the GMNF BA determination that implementation of the Forest Plan will not have an effect on the American peregrine falcon, bald eagle, Eastern cougar, or gray wolf. Therefore, these species will not be further addressed in this amendment.

The Canada lynx (*Lynx canadensis*) was recently federally listed as a threatened species. In its February 16, 2000 BO (issued prior to the listing of lynx) the FWS concurred that continued implementation of the Forest Plan is not likely to jeopardize the lynx due to a lack of current or historically important habitat as well as no current or recent historical records of the species on the Forest. Subsequent discussions with the FWS and additional analysis of potential lynx habitat resulted in a determination that there are no areas meeting the quantity or quality of habitat necessary to support lynx (Burbank 2000). Therefore, we will not address any changes to management direction for Canada lynx in this amendment. Should additional information become available changing this determination we will address it at that time.

Regional Forester's Sensitive Species List Update

The USDA Forest Service has a responsibility to avoid trends towards federal listing under the ESA, and to maintain species viability in the planning area under the National Forest Management Act (NFMA). When a species occurs within the proclamation boundary of a National Forest, and its population viability is perceived to be at risk, the species is designated as "sensitive" by the Regional Forester and is then included on a list of such species known as the Regional Forester's Sensitive Species (RFSS) List. Their subsequent management must be consistent with responsibilities noted above under the ESA and NFMA. Agency policy in FSM 2670, in addition to directing the listing

of such species by each region, directs the development of management objectives and management practices for sensitive species to achieve these ends.

On February 29, 2000, the Regional Forester designated 666 species as sensitive in the Eastern Region, updating the March 8, 1994 RFSS list. This update incorporates new information and designation criteria outlined in a regional supplement to FSM 2670 (Region 9 Supplement FSM 2670-2000-1). To update the RFSS list, biologists and botanists from the Forest Service, other state and federal agencies, academic institutions, and non-governmental organizations from across the region screened more that 4000 species of plants and animals perceived to be at risk. The screening resulted in a net increase across the Region from 202 species in 1994, to 666 species in 2000. The Eastern Region maintains the Region-wide list at the following website: **www.fs.fed.us/r9/tes/tes.htm**.

The GMNF evaluated well over 200 plant and animal species as part of this process (USDA 2000b). Species evaluated included all species listed in the Forest Plan as sensitive or species of concern. It also included species on the State of Vermont's threatened, endangered, or rare lists, as well as others identified by concerned citizens. Forest biologists, in cooperation with the Vermont Nongame and Natural Heritage Program and other biologists familiar with these species, conducted the evaluation process. As a result, the GMNF documented 87 species with occurrences within the GMNF proclamation boundary that we consider at risk (Table 3; see also Table 5 in app. 2). This compares with 18 species for the 1994 RFSS list. The Forest Plan, approved in 1987, includes 8 species proposed as sensitive (the first RFSS list was released after the Forest Plan was approved), and 71 additional species as forest "species of concern". As species of concern were also evaluated for possible RFSS listing, it became clear that many of these species had no current and often no historic occurrences on the GMNF, or did not have suitable habitat on the Forest. Consequently, those species with no current occurrences or reasonable expectation of future occurrence are proposed for removal from the Species of Concern list.

During the summer and fall of 2000, a programmatic BE of the Forest Plan for conservation and management of RFSS was prepared, which evaluated the effects of implementation of the Forest Plan on these species (USDA 2000c). This programmatic BE determined that there would be no impact to species known or likely to occur on the GMNF; that impacts to species known or likely from, but not identified as sensitive for, the GMNF would not lead to loss of viability or trend towards federal listing; and that impacts to those species identified as RFSS for the GMNF would also not lead to loss of viability or trend towards federal listing. However, recommendations were made in this programmatic BE to strengthen the Forest Plan, which are included in the proposed amendment.

Relationship to Other Documents and Laws

The legal background and authority for forest plan amendments is found in the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) as amended by the NFMA, implementing regulations found in 36 CFR Part 219.10 (f), the National Environmental Policy Act (NEPA), and implementing regulations found in 40 CFR 1500-1508. Direction specific to who is responsible and why and how to amend it is described in FSM 1922 and Forest Service Handbook 1909.12 chapter 5.

This proposed amendment is in accordance with chapter 5, page 5.04 of the Land and Resource Management Plan of the Green Mountain National Forest, the requirements of 36 CFR 219.10(f); and FSM 1922. The amendment is programmatic in nature; that is, it provides overall guidance for

management of the Forest rather than a specific project at a particular location. Further environmental analysis will be conducted for subsequent site-specific projects that implement the proposed Forest Plan amendment.

The Forest Supervisor is the authority in determining whether amendments are significant or not significant. This determination is made under the direction found in 16 U.S.C. 1604(f)(4), 36 CFR 219.10(f), and FSM 1922.5. The Forest Supervisor has followed these procedures and has determined that this is not a significant amendment to the Forest Plan because it does not meet both of the required definitions of significance.

The term "significant," as it pertains to a forest plan amendment, is not the same as "significant" in the context of addressing environmental effects in a NEPA analysis (as might be found in the language of an environmental assessment). "Significant", as it pertains to a Forest Plan amendment, gauges the impact of a proposed change to a forest plan. To meet the definition of significant, an amendment must meet both of the following criteria found in FSM 1922.5.

1) It must substantially alter the long-term relationship between the outputs of multiple-use goods and services (i.e., wildlife habitat, recreational opportunities, timber products) originally projected; and

2) It must have an important effect on the entire Forest Plan or affect the land and resources throughout a large portion of the planning area during the planning period.

As defined in FSM 1922.5, non-significant amendments can result from:

a) Activities that do not significantly alter the multiple-use goals and objectives in the long-term.

b) Adjustments to management area boundaries and prescriptions based on further on-site analysis.

c) Minor changes to standards and guidelines.

d) Incorporating opportunities for additional management practices that will contribute to achievement of management prescriptions.

This amendment does not meet the criteria for significance in items (1) and (2) above:

1) The long-term relationship between the outputs of multiple-use goods and services originally projected will not be substantially altered, as documented in the effects analysis of this environmental assessment. The effects sections (chapter 3) of this environmental assessment disclose that there are no substantial effects or substantial changes expected to any of the outputs of multiple-use goods and services originally projected by the Forest Plan by any of the alternatives being analyzed. Therefore, the long-term relationships between multiple-use goods and services will not be substantially altered.

2) While the amendment is important, its effects are primarily limited to the threatened and endangered species addressed; the actual effect on the entire Forest Plan is minimal. Although there would be minor effects across the Green Mountain National Forest, they would mostly

be limited to management activities occurring during the summer. This amendment occurs in the last few years of the current Forest Plan. Revision of the Forest Plan is anticipated to begin in 2002 or 2003.

This amendment does meet the criteria for a non-significant amendment listed in (a) and (c) above in the following ways:

a) The multiple-use goals and objectives for threatened and endangered species stated on pages 4.05 and 4.10 of the Forest Plan would not be altered.

c) The amendment does propose several minor changes to standards and guidelines. These are minor changes for two reasons. First, the changes will not substantially alter the outputs as stated in the Forest Plan. As discussed above, the effects analysis documented in this EA discloses what effects may occur. Second, the proposed changes to the standards and guidelines are minor because they will not substantially change how the Forest is currently being managed (see the "Forest Resource Management" section of chapter 3).

Public Involvement

The Forest Service mailed a letter describing the proposed Forest Plan amendment to approximately 1,082 individuals, organizations, county governments, and federal and state agencies on May 10, 2000. The Amendment was listed in the GMNF Schedule of Proposed Actions for the periods of January 1-March 31, 2000 and April 1-June 30, 2000. Comments on the proposed amendment were requested by June 14, 2000.

Through the public involvement process, 9 letters were received from various individuals and organizations. The letters received are found in Folder B of the Project File.

Issue Identification

Each response received during the scoping period was carefully considered. Some comments led to the development of new alternatives, while others are addressed in the "Issues Considered but Dismissed" or "Alternatives Not Considered in Detail" sections of the EA. Appendix 1 displays all comments received and the responses to those comments.

Public Issues Related to the Proposed Action

From public comments, three issues were identified. Two of these issues were used to generate additional alternatives, and are discussed below. The third issue did not generate additional alternatives, but it, along with the others, served as a basis for evaluating the Proposed Action and the alternatives, and assessing the environmental consequences.

Issue #1: Indiana bat Conservation and Recovery

Some people are concerned that the proposal only focuses on those actions needed to reduce harm to existing Indiana bats on the Forest. They believe the proposal needs to include actions to promote the conservation and recovery of the Indiana bats on the Forest, and that such actions (such as protection

of Indiana bat habitat requirements) should be included as part of the proposal and made a part of the Forest Plan, to ensure the species survival.

Response: This issue has been recognized and incorporated into the analysis through development of alternative actions, specifically Alternatives 3 and 5 that potentially promote conservation and recovery.

Issue #2: No warm weather logging of hardwood trees

Some people feel that the cutting of hardwood trees should be restricted to the winter months, so that the Indiana bat would be completely protected from harassment and accidental killings during the non-hibernating season.

Response: This issue has been recognized and incorporated into the analysis through development of alternative actions, specifically Alternative 4 (Proposed Action with No Summer Timber Harvesting), and Alternative 5 (Proposed Action with Conservation Measures and No Summer Timber Harvesting).

Issue #3: Species Viability

Some people are concerned that the management actions allowed by the current forest plan could threaten the population viability of the species on the RFSS list, as well as threatened, endangered and other sensitive species. They ask that the agency provide a description of the rationale and basis for concluding that current plan direction is adequate.

Response: This issue is addressed in chapter 3 of this EA, under the "Threatened, Endangered, and Sensitive Species" section, "Regional Forester's Sensitive Species" subsection. It is also addressed in the biological evaluation for this EA, found in appendix 2, and in more detail in the programmatic BE of the Forest Plan for RFSS (USDA 2000c).

Issues Considered but Dismissed

This section provides a description of other issues that were raised during public scoping but after careful consideration were dismissed from further analysis.

Issue #1: Management Indicator Species

There is concern that; (a) the Management Indicator Species (MIS) on the GMNF were poorly selected, and this, combined with a lack of monitoring, means that proposed management activities and standards and guidelines in the GMNF Forest Plan are inadequate to maintain population viability for threatened, endangered, and sensitive (TES) and other species, and (b) a biological inventory should have been prepared for the Indiana bat, and that the bat should be declared as a management indicator species, so that the plan would be adequate to monitor bat population levels.

Response: (a) Adequacy of the MIS species and monitoring – In 2000, the GMNF and Finger Lakes National Forest (FLNF) has been preparing a draft report entitled "A Systematic Review Of The Selection, Use, and Monitoring of Management Indicator Species On the Green Mountain & Finger Lakes National Forests". This draft report has reached the preliminary conclusion that the GMNF and FLNF used a systematic approach in selecting MIS, including the input of scientific

experts from universities, federal agencies, and state agencies. It also concluded that this information was properly incorporated into the GMNF and FLNF Land & Resource Management Plans and included a systematic monitoring program consistent with NFMA planning direction.

The draft report did caution that the MIS lists and MIS monitoring programs for both National Forests are likely outdated and need updating as part of the Forest Plan revision. This need for revision is particularly important given that; (1) the steady, decade-long, decline in early successional habitat may pose the greatest risk to the population viability of the GMNF vertebrate community and (2) current habitat trends on the FLNF may increase risks to the FLNF forest and shrubland vertebrate communities, particularly songbirds.

Just as importantly, the draft report concluded that the scientific value and limitations of the MIS concept needs serious re-evaluation. Even with seven years of systematic MIS field surveys it has not been possible to state, with any degree of certainty, what the population trends are for the majority of the MIS studied or for their community associates. Nor can a cause and effect relationship be established between population trends and weather, physical or biological factors (including forest management practices). It will take several "generations" of Forest Plans, if at all, to determine either the actual population trends or the causes for these trends. This conclusion agrees with Niemi et al. (1997)**:** "Most species responded to habitat attributes that satisfy their needs for survival and these autecological responses likely led to inconsistent patterns of species associations for most of the MIS." The lack of consistent patterns among most MIS casts doubt on the ability to use a few species, as indicators for the well being of many other species, especially for those that are uncommon and difficult to monitor. Developing more comprehensive techniques that improve habitat classifications and combine monitoring of trends in habitat and birds within those habitats likely will prove more fruitful than focusing on a few "representative species."

In spite of these needs, the draft report concluded that the GMNF and FLNF continue to successfully respond to emerging population viability issues by implementing new monitoring programs and new management direction on a species by species basis. However, this new direction needs to be formalized through amendments to the Forest Plan.

(b) The use of the Indiana bat as a management indicator species - The use of the Indiana bat as a management indicator species would be unwise for three reasons. First, it has not been demonstrated that viable populations of Indiana bats even exist on the GMNF. Secondly, assuming they did occur, their low numbers combined with the large amount of suitable habitat preclude population monitoring. Finally, given that they require a mosaic of habitat conditions, the cause and effect relationship between their population changes, changes in the GMNF landscape, and relationships with those wildlife species they are supposedly representing as an MIS would be extremely hard, if not impossible, to determine.

A more promising approach being used on the GMNF and FLNF is the comprehensive monitoring of woodland bat species as a group. This includes combining seasonal mist netting of woodland bats across a range of suitable habitats with the monitoring of habitat trends. Project specific monitoring is also taking place to insure that standards and guidelines for maintaining suitable habitat for the Indiana bat and other woodland bats as per the FWS BO are applied at the project level.

Chapter 2 The Alternatives Considered

An environmental assessment must include a reasonable range of alternatives. Alternatives to the Proposed Action should meet the purpose and need, and address at least one of the significant issues identified in chapter 1. A No Action alternative must also be included in the range of alternatives. This section of the EA displays those alternatives analyzed in more detail in the assessment, and those considered but eliminated from detailed study.

Descriptions of Alternatives Considered in Detail

Alternative 1: No Action

This alternative is the existing GMNF Forest Plan, as amended to date, and is the direction currently guiding management of the GMNF. Under this alternative, no amendment would be made at this time, but would be available for consideration in the future. Only those goals, objectives, standards and guidelines currently in the Forest Plan would be used to guide management for Indiana bat and RFSS. The Terms and Conditions defined in the BO (USDI 2000) would not be included in the Forest Plan, and, therefore, would not be required. This alternative is presented purely to satisfy the NEPA requirement for a No Action alternative as a basis for comparison; as it violates the NFMA and the ESA, it would be illegal to implement.

Alternative 2: Proposed Action

This alternative responds to the purpose and need to incorporate into the Forest Plan new information regarding federally listed threatened and endangered species, and RFSS. This information includes that found in the BA (USDA 1999), the BO (USDI 2000), and all reference material used to develop these documents, and the RFSS list update (USDA 2000a), the programmatic BE of the Forest Plan for RFSS (USDA 2000c), as well as FSM changes and other supporting documentation used to update the RFSS list. It also responds to the issue of compliance with the BO and the ESA by the GMNF.

Under this alternative, the existing Forest Plan would be amended to incorporate the Terms and Conditions of the BO, which were used to formulate the following general direction or standards and guidelines that would change or clarify current Forest Plan direction (USDI 2000). This alternative also reorganizes and updates direction in the Forest Plan regarding protected species in general, and RFSS species in particular.

Following are the proposed changes to the "Forest-wide Standards & Guidelines", "Resource Objectives", and "Activities and Outputs to be Monitored" (appendix C). The first group of changes focuses on Indiana bat; the second group focuses on protected species and RFSS changes. Existing plan direction is shown in plain text in quotations; existing text to be removed is shown with a ~~strike through~~; text to be added is shown in **bold text**. Appendix 3 displays how the text of the Forest Plan would change in appendix E and the "Wildlife and Fish" standards and guidelines to reflect the reorganization and clarification of information regarding TES species. The proposed changes in organization and clarification are also summarized below.

Changes Specific to Indiana Bat

The definition for "Den Tree" on page 4.31 would be amended to the following language:

"DEN TREE - A live **or dead** tree ~~at least 15" dbh~~ **of any diameter** containing a natural cavity **or exfoliating bark** used by wildlife for nesting, brood rearing, hibernating, **roosting**, daily or seasonal shelter and escape ~~from predators.~~**"**

An additional Standard and Guideline would be added to as item "i" under "B, - Wildlife Reserve Trees" on page 4.33:

i. All shagbark hickory trees will be reserved, unless they pose direct threat to human health and welfare.

Direction for den trees (found on page 4.33 under B.11) would be amended to include:

c. Reserve potentially suitable bat roosting trees; trees that exhibit exfoliating bark (e.g., shagbark hickory, trees with sloughing bark), either dead or alive and greater than 4" dbh.

d. Protect all known Indiana bat roost trees on the GMNF until such time as they no longer serve as roost trees (e.g., loss of exfoliating bark or cavities, blown down or decayed).

On page 4.32, under item B.9, the following would be added as item d, and the current "d" changed to "e", etc.:

d. Protect 1/3 of all large diameter (≥ 12 inches dbh) post-harvest snags by retaining live residual trees adjacent to these snags. Such reserve trees shall be located in groups and along intermittent drainages to provide foraging corridors into harvested areas, and where available, shall be Class 1 or Class 2 trees (as identified by Romme et al. 1995), or other trees exhibiting or likely to develop characteristics preferred by Indiana bats (e.g., exfoliating bark). This standard applies to the non-hibernation period only, which is from May 15 through August 30, except near hibernacula where fall swarming may occur through September into October.

The following would be added to page 4.86 as item "E", under Public Health:

E. In the event that it becomes absolutely necessary to remove a known Indiana bat roost tree, the U.S. Fish and Wildlife Service (FWS) shall be consulted and such a removal will be scheduled during the hibernation season. Trees identified as immediate threats to public safety may be removed at any time following consultation with the FWS.

Add the following to page 4.34 as item 1 under "Endangered and Threatened Species" and move current item 1 ("Peregrine Eyries") to the "Regional Forester's Sensitive Species" section and make it item 2:

1. **Indiana Bat**

   a. **Hibernacula**

      - **Determine an area of influence for an occupied Indiana bat hibernaculum that is on or adjacent to lands managed by the GMNF. The area of influence will be an approximate five-mile radius centered on the hibernaculum unless it is determined, based on best science available, that a larger radius is necessary.**

      - **In cooperation with the FWS and the Vermont Department of Fish & Wildlife, develop a management strategy on or before February 16 of 2002 that will minimize impacts on Indiana bats occurring on lands managed by the GMNF within the area of influence for all occupied Indiana bat hibernacula on or adjacent to the GMNF.**

      - **Consider occupied Indiana bat hibernacula as smoke-sensitive areas when planning for prescribed burns to be conducted from October to May. If hibernacula are in the vicinity of the area proposed for burning, wind direction, speed, mixing height, and transport winds will be considered to minimize drifting in or near occupied hibernacula.**

      - **Newly located bat hibernaculum will be assessed for potential threats to bats utilizing respective sites. Each hibernaculum will have its own, specifically designed management plan developed and implemented to insure continued bat use and protection.**

   b. **Maternity Sites**

      - **If monitoring activities result in the discovery of maternity sites on the GMNF, roost trees used by a maternity colony will be protected by establishing a zone centered on the maternity roost site. The actual area will be determined by a combination of topography, known roost tree locations, proximity to permanent water and a site-specific evaluation of the habitat characteristics associated with the colony. Protective measures shall be established by developing a management strategy, in cooperation with the FWS and the Vermont Department of Fish & Wildlife, immediately upon discovery.**

   c. **Further Consultation**

      - **If the Forest Service determines that activities on a project level are likely to adversely affect the Indiana bat, further consultation will be necessary.**

- **Formal consultation must be reinitiated if an individual project, or if the annual projected total of proposed projects, will result in exceeding the total of 300 acres annually affected by tree removal or disturbance during the non-hibernation season. However, site-specific projects proposed for the non-hibernation season may be surveyed for Indiana bat according to FWS protocols. If Indiana bats are not detected, it will be assumed that bats may be present in such low numbers that the project is not likely to adversely affect the Indiana bat. In this case, project acres will not be included in the annual allowable treatment of 300 acres.**

d. New Information

The Forest Service & Fish & Wildlife Service recognizes the limitations on available Indiana bat information. The following procedures will serve to gather new information:

1. **Habitat use at all sites where Indiana bats are documented on the GMNF should be characterized and quantified at both the local and landscape levels.**

2. **The Forest Service will provide the FWS with compliance reports indicating the project-specific conditions and an effects analysis for all projects that may affect the Indiana bat.**

3. **Information about the number of acres of trees harvested during the non-hibernation season must be monitored on an annual basis and shall be provided to the New England Field Office of the FWS no later that April 1 following the previous year's activities.**

4. **Care must be taken in handling dead specimens of listed species that are found in the project area to preserve biological material in the best possible condition. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure the evidence intrinsic to determining the cause of death of the specimen in not unnecessarily disturbed. The finding on dead specimens does not imply enforcement proceedings pursuant to the ESA. The reporting of dead specimens is required to enable the FWS to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective. Upon locating a dead, injured, or sick specimen of an endangered or threatened species, prompt notification must be made to the U.S. Fish & Wildlife Service's Essex Junction Division of Law Enforcement, 11 Lincoln Street, Room 105, P.O. Box 649, Essex Junction, Vermont 05453 (telephone: 802-879-1859), or the Region 5 Division of Law Enforcement, 300 Westgate Center Drive, Hadley, Massachusetts 01035-9589 (telephone: 413-253-8343).**

Add the following to page 4.86, under item A (Prescribed Fires) as item 4:

4. **Prior to the employment of any prescribed fire, provide the FWS's New England Field Office with the opportunity to review burn plans that could potentially affect Indiana bats.**

Amend page 5.03 to reflect monitoring requirements of the BO by changing the second sentence of the fourth paragraph to read:

"We have listed the monitoring which we would like to accomplish, as well as the monitoring frequency, ~~*and*~~ expected reliability, **and the terms and conditions of the 2/16/00 Biological Opinion from Fish & Wildlife Service, which requires monitoring for Indiana bat** (Appendix C)."

Another paragraph following the one above would also be added on page 5.03:

A plan delineating a monitoring protocol for Indiana bat should be developed in cooperation with the FWS and the Vermont Department of Fish & Wildlife and shall be completed on or before 2/16/02.

The following would be added to the table in appendix C, page C.04:

NFMA Requirement	Purpose of Monitoring	Item Monitored	Unit of Measure	Frequency of Measure	Expected Precision	Expected Reliability
219.19(a)(7) Indiana bat Terms and Conditions	**Determine the following*:*** **a) their presence or absence, b) their habitat use and movements during the non-hibernation season, c) the location of any potential maternity colonies, d) the major foraging areas used by male Indiana bats near occupied hibernacula during the non-hibernation season.**	**Bats detected on the Forest using nets, electronic detectors and radio-telemetry.**	**Number of bats and habitat variables**	**Annual**	**Moderate**	**Moderate**
	Comply with incidental take requirements	**The number of acres of trees harvested during the non-hibernation season must be monitored on an annual basis.**	**Acres**	**Annual**	**High**	**High**

NFMA Requirement	Purpose of Monitoring	Item Monitored	Unit of Measure	Frequency of Measure	Expected Precision	Expected Reliability
		Populations in hibernaculum	**Number and species of hibernat-ing bats**	**Once every 3 years**	**High**	**High**

Changes Specific to Regional Forester's Sensitive Species and Forest Plan Clarification

There are no alternatives for updating the Forest Plan regarding the RFSS list and clarifying changes other than the Proposed Action. This is due to the fact there were no issues concerning the Proposed Action raised during the scoping process that generated alternatives.

Due to changes in the identification and evaluation process for RFSS, the Forest Plan is out-of-date in regards to these species, and will be updated in the following ways (see also appendix 3 of this EA):

- All general and species-specific management direction for RFSS and species of concern will be moved from appendix E into the "Forest-wide Standards & Guidelines" section of the Forest Plan (chapter 4). What will remain in appendix E will be information on the different protected classes.

- The Wildlife and Fish Standards and Guidelines structure in chapter 4 of the Forest Plan will be modified by creating three sections: Federally Listed Endangered, Threatened, and Proposed Species; Regional Forester's Sensitive Species; and Forest Species of Concern, and by placing the direction for these species in the appropriate categories.

- Appendix E will be rewritten to clarify the distinctions between Federally listed species, RFSS, and Species of Concern, in terms of their respective designation authorities and associated program goals and responsibilities.

- Because of the dynamic nature of these various protected species lists, the proposed action will remove the lists of "Protected Species" in the Forest Plan (Tables E.01 and E.02). Language will be added to the Forest Plan stating that the lists of federally endangered, threatened, proposed, sensitive, and special concern species will be updated periodically, and will be available on the Region's and GMNF's website, at GMNF offices, and will be included in our annual monitoring report.

- The proposal updates the list of Species of Concern, removing species where there is clear evidence that such species are not known or likely to exist on the Forest, nor appear to have suitable habitat (see also Table 4 in Appendix 2). The proposal eliminates the Species of Uncertain Occurrence list from appendix E, and replaces it with the following standard and guideline in chapter 4:

  Species of concern to us may not presently be known to occur on the National Forest. If these species are encountered, they will be treated according to our general standards and guidelines for sensitive species until the evaluation process for inclusion into the Regional Forester's Sensitive Species list is complete.

The following items will be added to the Resource Protection Objectives to replace those under T E & S Species (Forest Plan Table 4.1):

Result	Expected Amount
Threatened, Endangered & Sensitive Species	
Inventory in potential habitat	**2,500 acres/year**
New occurrences found	**Unknown # of occurrences**
Biological evaluations prepared	**Unknown # of evaluations**
Protection through project mitigation	**Unknown # occurrences**
Conservation Assessments completed	**1 species or group/year**
Conservation Agreements signed	**Unknown # of species**

The following items will be added to the table in appendix C, under Management Problem #3, Wildlife Habitats, page C.07:

Management Problem	Purpose of Monitoring	Item Monitored	Unit of Measure	Frequency of Measure	Expected Precision	Expected Reliability
	Determine population trends of RFSS to evaluate persistence	**Plant Population**	**Population**	**Every 5 years, unless species strategy dictates a different schedule**	**High**	**Moderate**
		Peregrine falcon	**Habitat & Population**	**Annual**	**High**	**High**
		Bicknell's thrush	**Habitat & Population**	**Annual**	**Moderate**	**High**
		Common loon	**Habitat & Population**	**Annual**	**High**	**High**
		Woodland bats	**See Indiana bat**	**See Indiana bat**	**See Indiana bat**	**See Indiana bat**
		Animals of Stream and Pond Habitat	**Habitat**	**Annual**	**Moderate**	**High**
	Determine status of RFSS and species of viability concern	**RFSS & additional species of viability concern**	**Updated list**	**Annual**	**High**	**Moderate**

Alternative 3: Proposed Action with Conservation Measures

In addition to the Proposed Action described above, this alternative includes conservation measures that would benefit Indiana bat habitat and habitats for other woodland bat species. These measures

would also increase monitoring for bats and bat habitat. In addition, we would increase our Education and Outreach efforts related to Indiana bat conservation. Alternative 3 responds to Issue #1, "Indiana Bat Conservation and Recovery," described previously. Alternative 3 would include the following:

A new section would be added to page 4.34 in the Indiana bat section as item "e."

e. Enhancing Knowledge

- **In cooperation with the FWS and the Vermont Department of Fish & Wildlife, develop a plan to assess the number of suitable roost trees and the amount of preferred foraging habitat available to the species. Monitoring efforts should be centered within five miles of all known occupied Indiana bat hibernacula, within ¾ miles of any Indiana bat maternity colony or roost tree used by a male Indiana bat, and at selected sites (pre- and post-harvest).**

- **Provide training for appropriate GMNF employees on bats (including the Indiana bat) occurring on the GMNF. Training should include bat identification, biology, habitat requirements, and sampling techniques (including instructions on applicability and effectiveness of using mist net surveys vs. Anabat detectors to accurately determine the presence of various bat species). The proper training of GMNF biologists on bat identification and reliable methods for counting roosting bats will enable the Forest Service to monitor the status of the species.**

- **Develop an outreach program specifically directed towards northeastern woodland bat species and their conservation needs. The program might include the development of a slide show, interactive display, and presentations or activities suitable for all ages of the public.**

Add to chart on appendix C, page C.04, under 219.19(a)(7) Indiana bat Terms and Conditions.

NFMA Requirement	Purpose of Monitoring	Item Monitored	Unit of Measure	Frequency of Measure	Expected Precision	Expected Reliability
	Assess number of suitable roost trees and available foraging habitat	**Will be determined during development of plan for this assessment; see chap. 4, Wildlife &Fish Standards & Guidelines, Endangered, Threatened and Proposed Species section.**	**Varies**	**To be determined**	**Unknown**	**Unknown**
		Condition of known roost trees	**Roost trees**	**Annually**	**High**	**Unknown**

Add to page 4.32 as item h.1.

Retain 5 trees of suitable roosting quality per acre harvested defined as: hard snags over 9" DBH, live trees with exfoliating bark, den trees (>15" DBH with cavity opening), yellow birch and red maple >26" DBH considered "cull" or unacceptable growing stock. When possible, configure trees with roosting qualities in clumps along the edges of openings or riparian corridors.

Alternative 4: Proposed Action with No Summer Timber Harvesting

During formal consultation, the Fish and Wildlife Service identified reasonable and prudent measures, and terms and conditions to minimize the take of Indiana bats and documented these conditions in the BO. To achieve the objective of minimizing take of Indiana bats, this alternative replaces terms and conditions related to summer timber harvesting by discontinuing timber harvesting during the non-hibernation period (May 15 through August 30), with the exception that the no harvesting period would be longer if harvesting were to occur near hibernacula. In this case, the no harvesting period would extend through the month of October. It should be noted that, based on soil protection guidelines in the Forest Plan (Forest Plan page 4.22), standard operating procedures have been used so that timber harvesting does not occur during the months of April through July 15, as well as from October through mid November, so as to avoid soil erosion concerns associated with wet ground conditions. Therefore, the total decrease of warm weather harvest opportunities would amount to 6-10 weeks.

Alternative 4 also responds to Issue #2, "No warm weather logging of hardwood trees," described previously.

Under this alternative two standards and guidelines outlined in the Proposed Action were eliminated as they apply to the non-hibernation season. All other components of Alternative 4 remain the same as described in the Proposed Action.

The following standards and guidelines that would not be included in Alternative 4 are listed below.

Design skid trails to avoid the need to fell suitable roost trees (as identified by Romme et al. 1995*)*

Protect 1/3 of all large diameter (≥ 12 inches dbh) post-harvest snags by retaining live residual trees adjacent to these snags. Such reserve trees shall be located in groups and along intermittent drainages to provide foraging corridors into harvested areas, and where available, shall be Class 1 or Class 2 trees (as identified by Romme et al. 1995), or other trees exhibiting or likely to develop characteristics preferred by Indiana bats (e.g., exfoliating bark).

Alternative 5: Proposed Action with Conservation Measures & No Summer Timber Harvesting

This alternative combines Alternative 3 - Proposed Action with Conservation Measures, and Alternative 4 – Proposed Action with No Summer Timber Harvesting. Standards and guidelines and general direction would be as described in those two alternatives. The difference between Alternatives 4 & 5 is Alternative 5 would retain the standards and guidelines that would be deleted from Alternative 4 (see Alternative 4 above). The reason for retaining them under Alternative 5 is these two standards and guidelines are considered additional conservation measures to protect suitable roost trees.

Alternatives Not Considered in Detail

Two commenters suggested alternative forest management practices. The alternatives suggested, and the rationale for not considering them in more detail, are described below.

No Evenaged Management

One respondent to the scooping letter felt that evenaged forest management practices, such as clearcutting, shelterwood and seed tree cutting should no longer be used. He felt that if individual tree selection was the only method conducted, this would ensure a continuous supply of big, old roost trees for bats and other species on every acre logged.

Response: The GMNF Forest Plan displays current resolution to our goal to "maintain adequate quality, amount and distribution of habitats to support viable populations of all existing native and desired non-native vertebrate species on the National Forest" (see Forest Plan page 4.05), using several management tools including timber harvest "planned and prioritized to provide a mosaic of areas of different aged vegetation" (see Forest Plan page 3.04). Degraaf et al. (1992) display the relationship between various silvicultural systems/treatments for northern hardwoods (the predominant forest type of the GMNF) and terrestrial vertebrates in their publication *New England Wildlife: Management of Forested Habitats* on pages 72-79. Table 12 on page 79 of this report displays the relationship between breeding birds and early successional habitat, and is reprinted with permission below.

Table 2 displays a listing of terrestrial wildlife species that prefer early successional habitats which is created by forms of evenaged management; the source for this display of habitat relationships is the NEWILD wildlife database and software program package (Thomasma et al. 1998).

Clearly the decision to eliminate evenaged management of northern hardwood habitats from the GMNF would have impact to a number of wildlife species. Such a decision requires significantly greater, and different, analysis to complete; this level of detailed analysis is not required to make a decision addressing our current purpose and need.

Table 1. Year in which breeding bird species first appear, become common, and decline in seedling and sapling stands of northern hardwoods in New England after clearcutting.

Bird Species	First appear	Become common	Decline
Eastern bluebird	1	1	2
Northern flicker	1	1	7-10
Willow flycatcher	1	4	7-10
Winter wren	1		2
Swainson's thrush	2	4	15*
Chestnut-sided warbler	2	4	10
Mourning warbler	2	5	7-10
Common yellowthroat	2	6	10
American goldfinch	2	6	7-10
Cedar waxwing	2	4	7-10
Veery	3	6	*
Black-and-white warbler	3	4	15*
Rose-breasted grosbeak	3	15	*
Canada warbler	5	15	*
Ruffed grouse	10	15	*
Wood thrush	10	15	*
Ovenbird	10	15	*
Black-throated blue warbler	15	*	*
Black-throated green warbler	15	*	*

*Present throughout the remainder of the developing stand.

Source: After DeGraaf et al. 1992.

Additionally, there exists no clear documentation, nor evidence from GMNF survey work, that indicate Indiana bats prefer, or benefit from, habitats managed strictly through all-aged silviculture (over those managed through even-aged silviculture).

For these reasons this option for management is not being considered by this analysis.

Increase Rotation Age of Hardwoods

It was also suggested that the Forest Service increase the average "rotation" age of hardwoods, where possible. It was felt that this effort, when combined with primarily unevenaged management methods, would ensure a continuous supply of big, old roost trees on every acre under hardwood management. It was stated some trees like sugar maple and yellow birch do not exhibit exfoliating bark until very old, often older then the rotation age (which is 100 years) now set in the Forest Plan for management area 3.1. It was thought the longer rotation age would promote the production of high quality sawtimber and recreation experiences, which are goals of the forest plan.

Response: See discussion (above) regarding potential issue associated with shifting timber management to strictly unevenaged management.

Table 2. Preferred early successional habitats for terrestrial wildlife species.

Species	Old field/shrub	Hardwood Seedlings	Hardwood Saplings
American Woodcock			*
Northern Saw-whet Owl		*	
Whip-poor-will			*
Ruby-throated Hummingbird		*	
Northern Flicker		*	
Willow Flycatcher	*	*	
Least Flycatcher			*
Blue Jay			*
Eastern Bluebird		*	
Veery			*
Swainson's Thrush		*	
Red-eyed Vireo		*	*
Tennessee Warbler		*	
Chestnut-sided Warbler		*	
American Redstart			*
Ovenbird			*
Mourning Warbler		*	
Common Yellowthroat		*	
Rose-breasted Grosbeak			*
Fox Sparrow	*		
White-throated Sparrow	*		
Hoary Redpoll		*	
Smoky Shrew			*
Eastern Cottontail	*	*	
Snowshoe Hare	*		
White-footed Mouse	*	*	*
Southern Red-backed Vole		*	*
Woodland Jumping Mouse	*		*
Porcupine		*	*
Red Fox		*	
Gray Fox			*
Black Bear		*	
Fisher			*
Ermine	*		
Striped Skunk	*		
White-tailed Deer		*	
Totals	**9**	**19**	**16**

Maintain Canopy Closure

Another suggestion was to maintain canopy closure suitable for Indiana bat roosting and foraging on every acre where timber is logged, which would mean a shift toward unevenaged regeneration and away from evenaged management (see discussion above).

Response: Romme, et al. (1995), developed a Habitat Suitability Model that describes habitat conditions important to Indiana bats. Canopy closure is important for both roosting habitat and for foraging habitat. For roosting habitat this model indicates "that if there is < 25% tree cover, the

habitat suitability will be low. Sites with between 60% and 80% canopy cover provide optimal conditions… Sites with > 80% cover are sub-optimal." For foraging habitat this model indicates that "if there is < 10% tree canopy cover, there is not enough substrate to support efficient foraging… Optimal habitat is assumed to be between 50% and 70%. Foraging habitat declines somewhat as cover approaches 100% because it is more difficult for bat to maneuver within a dense canopy. Combining the two optimal situations, apparent optimum range of canopy cover (that addresses both roosting and foraging) is between 60% to 70%, with a somewhat larger "bracket" of 50% to 80% that would optimize either roosting or foraging, with one of the conditions being somewhat sub-optimal.

This model also describes the effect of understory crown density, within 2 meters of the base of overstory canopy, on the suitability for roosting; stating that "the quality of roosting habitat that includes apparently suitable roost trees will be reduced if access to the tree canopy is restricted by dense understory vegetation". The model indicates that optimal range for this "layer" of understory is between 0% and 30%, with optimality reducing as that density increases beyond 30%.

In the FWS's BO on the Effects of the Land and Resource Management Plan and other Activities on Threatened and Endangered Species in the Green Mountain National Forest (issued on February 16, 2000), it is documented that "adverse effects on Indiana bat roosting habitat in the GMNF are expected to be insignificant due to the large amount of available roosting habitat within the GMNF that will not be affected at any given time". This BO also discusses effects to foraging habitat, indicating, "…the Indiana bat is considered to be a foraging generalist and will take advantage of prey found in numerous types of forest conditions. An abundance of insect prey is likely to be available throughout the GMNF at most time of the year when Indiana bats might be present. Research also indicates that this species forages over a wide range of habitats, including riparian corridors, upland areas, shelterwood cuts, and other disturbed areas (U.S. Fish and Wildlife Service 1999a)".

Clearly, the significance of canopy closure for the limited acreage being harvested on the GMNF has not been established for the conservation and recovery of the Indiana bat. Lacking significance, the cessation of evenaged silviculture on the GMNF does not address the purpose and need of this analysis, and will not be considered during this analysis.

Chapter 3 The Affected Environment and the Effects of the Alternatives

This chapter describes the expected direct, indirect, and cumulative effects of the Proposed Action and the alternatives. Biological, physical, social, and economic factors are considered in this chapter or in the appendices. The analysis focuses on topics derived from the key issues of the proposal and the findings needed to develop the Decision Notice and Finding of No Significant Impact.

Ecological Context

The following ecological context is based in large part on the work of McNab and Avers (1994) and Keys et al. (1995) in developing Ecological Regions and subregions of the United States. The GMNF falls within two broad ecological regions called provinces: the ***Laurentian Mixed Forest Province (212)***, which extends from the Northern Great Lakes through Lake Champlain and the St. Lawrence and portions of coastal Maine; and the ***Adirondack-New England Mixed Forest-Coniferous Forest-Alpine Meadow Province (M212)***, which includes the mountainous regions of New England and New York. These provinces are broken down into smaller subregions known as sections. Within the Laurentian Mixed Forest Province, the subregion associated with the GMNF is the **St. Lawrence and Champlain Valley Section (212E)**. The portion of this section associated with the Forest is along the Lake Champlain basin, and accounts for approximately 6,300 acres or about 2 percent of the land base along its northwestern edge. Within the Adirondack-New England Mixed Forest-Coniferous Forest-Alpine Meadow Province, the subregion associated with the GMNF is the **Green, Taconic, Berkshire Mountains Section (M212C)**, which can be further broken down into subsections associated the individual mountain ranges and/or portions thereof. Consequently, the GMNF is composed of the Green Mountains, which are further divided into a Northern Green Mountain subsection (M212Ca), a Southern Green Mountain subsection (M212Cd); and the Taconic Mountains (M212Cb), which occupy the southwestern corner of the GMNF Proclamation Boundary. While the Green Mountain portions of GMNF account for approximately 93 percent of the land base, the Taconics account for only about 5 percent.

St. Lawrence and Champlain Valley Section

Within the GMNF portion of this section, the terrain is dominated by low hills and low relief. The areas within the GMNF tend to be associated with deposits of glaciofluvial materials, or Pleistocene lacustrine deposits during the maximum extent of Lake Vermont, a Pleistocene precursor of Lake Champlain. Elevations range from 80-1,000 feet, and local relief can range from 500-1000 feet. Gentle slopes cover 50-80 percent of the area. The climate generally associated with the Champlain Valley is average annual precipitation of 30-40 inches per year evenly distributed throughout the year, with snowfall averages of 40-60 inches per year. Growing season is generally 120-140 days. Potential natural vegetation includes transition hardwood-white pine-hemlock, northern hardwood-elm-red maple, northern hardwood, oak-hickory, and oak-pine communities. Fire is an important small-scale disturbance regime on areas of droughty soils and western exposures.

Green, Taconic, Berkshire Mountains Section

Within the GMNF portion of this section, the terrain is highly variable, reflecting significant differences between the component mountain ranges and portions of ranges within the section.

However, climate, potential natural vegetation, and disturbance regimes can be generalized across the entire region. Mean annual precipitation is 36-70 inches per year, evenly distributed. Total annual snowfall ranges from 96-160 inches. Rain and snowfall increase with elevation. Growing season lasts from 80-130 days. Potential native vegetation is dominated by northern hardwoods, northern hardwood-spruce, and montane spruce-fir, with smaller areas of rich northern hardwoods, lowland spruce-fir, alpine krummholtz, alpine meadow, eastern hemlock, paper birch, aspen, and oak/pine communities. These montane forest communities tend to be stratified by altitude, with hardwoods on the lower and mid slopes, and spruce-fir at the upper slopes and ridgetops, and alpine vegetation at the highest elevations (only one occurrence on the National Forest). Montane forests in this region lack significant fire regimes and are characterized by large blowdown disturbances resulting from hurricanes or other severe wind events, damage due to severe ice storms in winter and smaller area, single tree phenomena.

Vermont Escarpment

This landscape occurs along the western edge of the Northern and Southern Green Mountains within the GMNF. It is dominated by a thrust fault escarpment of high relief, from which hills and wave cut Pleistocene terraces descend west to Lake Champlain. The escarpment is unique both by its marking the physiographic transition from glacial lake plain to mountains at the point of a thrust fault, and the climatic transition from the typical warm and mesic Champlain Valley climate to the cold to frigid mountain climate. Near the base of the escarpment, natural communities include hemlock forests, transitional hardwood forests, northern hardwood forests, oak-hardwood forests, oak-pine forests, and oak-hickory forests. Near the top of the escarpment, red spruce becomes a component on rocky sites, and warmer climate species start to drop out. Due to exposures of rock and past fire history, red pine, pitch pine, and chestnut oak are also scattered along the escarpment. Fire is documented as a disturbance regime here due to the exposure of the landscape to eastward moving fronts passing through the Champlain Valley. Small veins and interbedding of calcareous rock occur scattered throughout the escarpment, and lead also to richer natural communities and cliff dwelling stands of northern white cedar in places.

Northern Green Mountains

The majority of the land within this subsection occurs north of the National Forest. Within this subsection on the GMNF, the mountains are north-south trending, linear ranges. They are dominated by schistose bedrock, and often have calcareous rock mixed in, resulting in richer natural communities. Slopes tend to be linear, with moderate to high and even relief. Small areas of lower slopes and valley bottoms occur within the GMNF portion of the Northern Green Mountains, but they are scattered.

Southern Green Mountains

Most of this subregion falls within the GMNF. The terrain can be described as highlands characterized by dissected, flat-topped plateaus with scattered monadnocks. This leads to large areas of generally low relief and low to moderate slopes with smaller patches of high relief and steep slopes - virtually the opposite pattern of the Northern Green Mountains. In this subregion on the GMNF, the plateaus fall at the critical altitudinal/climatic break between northern hardwood forests and spruce-fir forests, leading to a great deal of mixing of the two forest types and no clear zonation patterns. The underlying rock is resistant, Precambrian gneiss and generally offers little in the way of available

nutrients for plants - hence the forests here tend to be less rich and diverse than those north (although small veins of calcareous rock do occur here as well).

Taconics

This subregion contrasts with the plateaus to the east in being more deeply cut into peaks, sharper ridges and canyons with a linear, north to south topographic trend. Vegetation zonation patterns are more distinct here, although there is less spruce and more oak in the southwestern mountains. Due to some major geological activity in this area, marble is found underlying the lower slopes and valleys, and slates and phyllites underlying the upper slopes; this creates a juxtaposition of exemplary rich northern hardwood forests along the lower slopes and to the east, and dry, less diverse hardwood and oak-hardwood forests and some woodlands along mid slopes and to the northwest. Fire may have been more common here than in the rest of the mountains excluding the escarpment. Although the Proclamation Boundary of the GMNF includes the majority of the Vermont portion of this range, very little National Forest System (NFS) land (<6,000 acres) has been acquired as yet in this subregion.

Threatened, Endangered, and Sensitive Species

Affected Environment

The Federal Endangered, Threatened or Proposed Species and Regional Forester's Sensitive Species lists for the GMNF includes 92 species (Table 3). A detailed discussion of the 92 species, their potential habitats, and an analysis of potential impacts associated with the alternatives proposed in this document are addressed in the "Biological Evaluation for the Threatened, Endangered, and Sensitive Species Amendment" (appendix 2).

As noted earlier in the EA, in February 2000 the FWS issued a BO in response to a programmatic BA prepared by the GMNF for federally listed species (USDI 2000; USDA 1999). The BA determined, and the FWS concurred, that implementation of activities outlined in the Forest Plan would lead to "No Effect" for three species (Bald eagle, Eastern cougar, Gray wolf); would "Not Likely to Adversely Affect" one species (American peregrine falcon); and would "Not Likely to Jeopardize the Continued Existence" of a fifth species (Canada lynx). The remaining species (Indiana bat) received a "May Affect – Likely to Adversely Affect" determination. Only the Indiana bat was carried forward into formal consultation, because of the "May Affect – Likely to Adversely Affect" determination. The other species that were not carried forward into formal consultation are not detailed further in this effects section because of their determinations by the GMNF and concurrences by the FWS.

Also as noted earlier, the Regional Forester for Region 9 of the Forest Service updated the RFSS list in February of 2000 (USDA 2000a). The GMNF identified 87 species for inclusion on this Regional list, of which four are identified in the Forest Plan already as sensitive. Also as noted, the programmatic BE of the Forest Plan for RFSS (USDA 2000c) determined that implementation of the current Forest Plan may impact individuals, but would not lead to loss of viability or trend towards federal listing of any of the RFSS. It also proposed recommendations to strengthen the Forest Plan in its conservation of RFSS. As the Proposed Action and other action alternatives will affect all of these 87 species to some degree, they are carried forward into the effects analysis.

Table 3. Federal endangered, threatened, proposed, and Regional Forester's Sensitive Species for the GMNF, October 2000.

Scientific Name	Common Name	Federal Status 2000
FEDERAL ENDANGERED, THREATENED, AND PROPOSED		
MAMMALS		
Canis lupus	Gray wolf	LE[a]
Felis concolor cougar	Eastern cougar	LE
Lynx canadensis	Canada lynx	LT[b]
Myotis sodalis	Indiana bat	LE
BIRDS		
Haliaeetus leucocephalus	Bald eagle	LE
REGIONAL FORESTER'S SENSITIVE SPECIES		
MAMMALS		
Myotis leibii	Eastern small-footed myotis	S[c]
BIRDS		
Catharus bicknellii	Bicknell's thrush	S
Falco peregrinus anatum	American peregrine falcon	S
Gavia immer	Common loon	S
AMPHIBIANS		
Ambystoma jeffersonianum	Jefferson salamander	S
REPTILES		
Clemmys insculpta	Wood turtle	S
MOLLUSKS		
Alasmidonta varicosa	Brook floater	S
Lasmigona compressa	Creek heelsplitter	S
INSECTS		
Aeshna tuberculifera	Black-tipped darner	S
Aeshna verticalis	Green-striped darner	S
Arigomphus furcifer	Lilypad clubtail	S
Calopteryx amata	Superb jewelwing	S
Cicindela marginipennis	Cobblestone tiger beetle	S
Gomphus (=*Phanogomphus*) *descriptus*	Harpoon clubtail	S
Gomphus adelphus	Mustached clubtail	S
Lanthus vernalis	Southern pygmy clubtail	S
Lestes eurinus	Amber-winged spreadwing	S
Ophiogomphus (=*Ophionurus*) *mainensis*	Maine snaketail	S
Somatochlora elongata	Ski-tailed emerald	S
Somatochlora forcipata	Forcipate emerald	S
Somatochlora minor	Ocellated emerald	S
PLANTS		
Agrostis mertensii	Arctic bentgrass	S
Aureolaria pedicularia	Fernleaf yellow false-foxglove	S
Blephilia hirsuta	Hairy woodmint	S
Calamagrostis stricta ssp *inexpansa*	New England northern reed grass	S
Cardamine parviflora	Small-flower bitter-cress	S
Carex aestivalis	Summer sedge	S
Carex aquatilis	Water sedge	S
Carex argyrantha	Hay sedge	S
Carex atlantica	Prickly bog sedge	S
Carex bigelowii	Bigelow sedge	S

Table 3 - *Continued*

Scientific Name	Common Name	Federal Status 2000
Carex foenea (=*aenea*)	Bronze sedge	S
Carex lenticularis	Shore sedge	S
Carex michauxiana	Michaux sedge	S
Carex schweinitzii	Schweinitz's sedge	S
Carex scirpoidea	Bulrush sedge	S
Clematis occidentalis var *occidentalis*	Purple clematis	S
Collinsonia canadensis	Canadian horsebalm	S
Conopholis americana	Squaw-root	S
Cryptogramma stelleri	Steller’s cliffbrake	S
Cypripedium parviflorum var *parviflorum*	Small yellow ladyslipper	S
Cypripedium parviflorum var *pubescens*	Large yellow ladyslipper	S
Cypripedium reginae	Showy ladyslipper	S
Desmodium paniculatum	Paniculate tick-trefoil	S
Draba arabisans	Rock whitlow-grass	S
Dryopteris filix-mas	Male fern	S
Eleocharis intermedia	Matted spikerush	S
Eupatorium purpureum	Sweet joe-pye-weed	S
Geum laciniatum	Rough avens	S
Isoetes tuckermanii	Tuckerman's quillwort	S
Isotria verticillata	Large whorled pogonia	S
Juglans cinerea	Butternut	S
Juncus trifidus	Highland rush	S
Lespedeza hirta	Hairy bush-clover	S
Listera auriculata	Auricled twayblade	S
Littorella uniflora	American shore-grass	S
Muhlenbergia uniflora	Fall dropseed muhly	S
Myriophyllum farwellii	Farwell's water-milfoil	S
Myriophyllum humile	Low water-milfoil	S
Panax quinquefolius	Ginseng	S
Pellaea atropurpurea	Purple-stemmed cliffbrake	S
Peltandra virginica	Green arrow-arum	S
Phegopteris hexagonoptera	Broad beech fern	S
Platanthera orbiculata	Round-leaved orchis	S
Polemonium vanbruntiae	Eastern jacob's ladder	S
Potamogeton biculpatus	Snail-seed pondweed	S
Potamogeton confervoides	Tuckerman's pondweed	S
Potamogeton hillii	Hill's pondweed	S
Prenanthes trifoliolata	Three-leaved rattlesnake-root	S
Pyrola chlorantha	Green pyrola	S
Ribes triste	Wild red currant	S
Saxifraga paniculata	White mountain saxifrage	S
Scheuchzeria palustris ssp *americana*	Pod-grass	S
Scirpus subterminalis	Incomplete bulrush	S
Sedum rosea	Roseroot stonecrop	S
Selaginella rupestris	Rock spikemoss	S
Sisyrinchium angustifolium	Narrow blue-eyed grass	S
Sisyrinchium atlanticum	Eastern blue-eyed grass	S
Solidago squarrosa	Stout goldenrod	S

Table 3 - *Continued*

Scientific Name	Common Name	Federal Status 2000
Sorbus decora	Northern mountain-ash	S
Sparganium fluctuans	Floating bur-reed	S
Torreyochloa pallida (= *Glyceria fernaldii*)	Fernald alkali grass	S
Utricularia geminiscapa	Hidden-fruited bladderwort	S
Utricularia resupinata	Northeastern bladderwort	S
Uvularia perfoliata	Perfoliate bellwort	S
Vaccinium uliginosum	Alpine bilberry	S
Woodsia glabella	Smooth woodsia	S

[a]Species is federally listed as endangered under the ESA.
[b]Species is federally listed as threatened under the ESA.
[c]Species is listed on the USDA Forest Service Region 9 RFSS list.

Direct and Indirect Effects

The discussion that follows will pertain primarily to Indiana bat, as no other TES species were determined to be adversely impacted by the Proposed Action or any alternatives. A detailed analysis of effects is contained within appendix 2.

Indiana bat – *Myotis sodalis*

Alternative 1: No Action

This alternative is the existing GMNF Forest Plan, as amended to date, and is the direction currently guiding management of the GMNF. Short and long-term effects, as well as direct and indirect effects of implementation of the Forest Plan, as they relate to federally listed species, are detailed in the August 27, 1999 Green Mountain National Forest programmatic BA. However, because the Terms and Conditions would not be incorporated into the Forest Plan, this alternative is a direct violation of the ESA and NFMA, and would be illegal to implement. The effects to Indiana bats are summarized below.

Indiana bat populations have continued to decrease in Vermont since the mid-1930s, and range-wide in the past two decades.

Indiana bats hibernate in one cave within the GMNF proclamation boundary (owned by The Nature Conservancy). This hibernaculum has not been designated as critical habitat; however, the cave is gated and is closed seasonally to minimize disturbance during the hibernation period. To date, no maternity colonies are known to occur on the GMNF. Additionally, summer survey efforts in 1999 and 2000 have failed to capture any Indiana bats on GMNF lands.

About 95% of the GMNF is currently forested, with 89% hardwood forest types and 83% mature trees (USDA 1999, 17). Forest communities on about 141,000 acres are prescribed for timber management; the remaining acreage (approximately 230,000) of the GMNF is subject primarily to natural forces (USDA 1999, 16). Hardwood forest types comprise 89% of the NFS lands within Management Areas suited for commercial timber harvesting, while comprising 88% of the NFS lands

managed for values other than timber. Since 1987, about 12,630 acres of dense, mature forest have been commercially thinned, regenerated, or selectively harvested to create the more open forest canopies which provide quality habitat for Indiana bats (USDA 1999, 51). Standing dead trees and large, overmature trees which Indiana bats may use as roost trees are abundant across the forest.

The risk of removing an occupied Indiana bat roost tree or a traditional maternity roost tree is extremely small considering: (1) the small amount of the GMNF affected annually by tree removal (approximately 1,774 acres/yr); (2) the fact that most of this removal occurs during the bat hibernation when they are not roosting in trees (approximately 80%); and (3) the vast number of suitable roost trees (both living and dead) available for a relatively small number of bats (see Figs. 1 & 2, "Forest Resources Management" section). Although, the possibility of take still exists, the BO concluded that implementation of the Forest Plan, as proposed in the BA, was not likely to jeopardize the continued existence of the Indiana bat.

While there is still no scientific agreement over the principal causes of the continued decline of this species, under this alternative the GMNF will implement existing guidance in the Forest Plan that offers incidental protection for Indiana bats, such as those activities outlined below. We will continue to protect and manage existing habitat; create and maintain additional habitat where possible, educate the public concerning the plight of this species; search out the best information available for this species, and collect information about this species' use of the GMNF.

Forest and Forest Plan actions that have contributed to habitat protection and management for Indiana bats from 1987 to the present include:

Public Education

- Presentations to area schools and organizations
- Development of public exhibit of bats of the northeast
- Development and distribution of fact sheet specific to Indiana bat statistics and management situation

Habitat Improvement

- Gating of the one known bat hibernaculum owned by the GMNF
- Construction and installations of bat roost boxes throughout GMNF

Monitoring

- Annual hibernacula surveys in GMNF and Vermont
- Summer surveys in 1999 and 2000 for bats using GMNF
- Annual review of post-treatment snag and den tree retention
- Annual review of tree mortality

Management of late-successional and old growth woodland habitats

- LRMP direction provides for old-growth values on 63% of GMNF

Assessment of Potential Habitat

- Approximately 5,000 acres have been assessed annually, on a site specific basis, to determine suitability for Indiana bats
- Development of GMNF protocol to assess potential relationship between projects and Indiana bat habitat

Alternative 2: Proposed Action

Under this alternative, the existing Forest Plan would be amended to incorporate the mandatory Terms and Conditions of the BO. The BO concluded that the effects of implementing these Terms and Conditions would be to minimize the level of Incidental Take identified for Indiana bats on both a programmatic and site-specific scale. These would be in addition to the effects of implementing the existing Forest Plan, as amended, which are described in the August 1999 programmatic BA and summarized in Alternative 1 above. Terms and Conditions that apply to the Indiana bat are found in the BO (USDI 2000, 36-40). They are summarized in the description of Alternative 2 in chapter 2 of this EA.

As discussed in this BO the integration of these terms and conditions into our Forest Plan through the amendment process, will

- "minimize the level of the incidental take identified for the Indiana bat on both a programmatic and site-specific scale",
- "minimize the potential effect of smoke on occupied Indiana bat hibernacula or roosting bats during fall swarming",
- "help the Service (U.S. Fish and Wildlife Service) to assess the efficacy of the standards and guidelines and the terms and conditions in protecting the Indiana bat on the GMNF", and
- "ensure compliance with the terms and conditions, as well as determine the level of incidental take on a project level"

Alternative 3: Proposed Action with Conservation Measures

In addition to the effects already described for Alternative 2, we anticipate that implementation of these additional conservation measures will contribute to:

- An increase in habitat suitability (over the Proposed Action) for roosting at a landscape level, through the retention of additional suitable roost trees during timber management activities.
- Greater ability to monitor the status of all woodland bats, through "proper training of GMNF biologists on bat identification and reliable methods of counting bats".
- Enhanced knowledge of roost tree suitability and availability, and the availability of preferred foraging habitat.
- Potential growth of woodland bat conservation throughout New England through, greater citizenry understanding of woodland bats and their conservation.

Alternative 4: Proposed Action with No Summer Timber Harvesting

This alternative has similar effects to those discussed for Alternative 2. It differs from the Proposed Action (Alternative 2) in that no timber harvest would be conducted during the non-hibernation period for Indiana bats. The non-hibernation period is considered to be from May 15th through August 30th in areas distant from hibernacula, and from April 1st through October 31st in areas near hibernacula - approximately 5 miles radius from hibernacula (USDI 2000, 37).

This alternative effectively negates the need for two proposed S&Gs proposed by Alternative 2; as any S&G specific to summer harvest operation would not be needed. Specifically the two S&Gs are:

- Design skid trails to avoid the need to fell suitable roost trees (as identified by Romme et al. 1995)
- Protect 1/3 of all large diameter ($\geq$ 12 inches dbh) post-harvest snags by retaining live residual trees adjacent to these snags. Such reserve trees shall be located in groups and along intermittent drainages to provide foraging corridors into harvested areas, and where available, shall be Class 1 or Class 2 trees (as identified by Romme et al. 1995), or other trees exhibiting or likely to develop characteristics preferred by Indiana bats (e.g., exfoliating bark).

During formal consultation, the FWS identified reasonable and prudent measures, and terms and conditions to minimize the take of Indiana bats and documented these conditions in the BO. Eliminating summer timber harvest, in theory, further reduces potential for incidental take of Indiana bats – through the reduction in number of potentially occupied roost sites that could be disturbed. Given that two years of monitoring for woodland bats (including Indiana bats) has not revealed if and where Indiana bats are roosting on the GMNF, and lacking any additional Forest-specific information, it is difficult to determine the degree of benefit achieved through this further reduction. Therefore, our analysis concludes that reducing the chances of incidental take are not likely to be different from those in Alternative 2.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

This alternative would have similar effects to those described for Alternatives 3 and 4. The difference between Alternative 4 and 5 is that Alternative 5 would retain the standards and guidelines that would be deleted through adoption of Alternative 4 (see preceding discussion). Retention of these two S&Gs furthers conservation actions specific to habitat suitability for Indiana bat.

Implementation of these two S&Gs would further enhance habitat suitability (over all alternatives) for roosting at a landscape level, through the retention of additional suitable roost trees during all timber management activities.

Regional Forester's Sensitive Species (RFSS)

Alternative 1: No Action

As the Forest Plan recognizes sensitive species as a protected group, has specific guidelines for some sensitive species, recognizes their designation by the Regional Forester, and provides protection for these species within the management guidelines of the current Forest Plan (1987, 4.35; E.01-E.07), any changes in the RFSS list (including this latest update) will trigger protection for any new sensitive

species for the GMNF. Implementing existing Forest Plan guidance will control most of the limiting factors that the GMNF can influence in sensitive species habitats. Consequently, we conclude that implementing the Forest Plan has some beneficial impacts to RFSS; where the impacts are negative, they are not likely to lead to loss of viability or trend towards federal listing. This conclusion is further discussed in the appendix 2 and the programmatic BE of the Forest Plan for RFSS (USDA 2000c).

Alternative 2: Proposed Action

General effects of implementing this alternative on RFSS appear to be limited, and are described in more detail in Appendix 2. Creating protection zones around potential or actual maternity roost trees is the only area that could conceivably create conflicts with RFSS protection, and then only for species that actually occur in those zones and require disturbance (i.e. such zones would eliminate disturbance within the zone). Disturbance could be needed, for example, in terms of human presence for monitoring, reducing shade for shade intolerant species, introduction of fire for habitat maintenance, or eliminating invasive exotic species. The probability of the coincidence of a known RFSS occurrence with the protection zone of a maternity roost tree is so low at this time (given the current lack of known roost trees on the Forest) as to make the risk nearly discountable. In any case, given the language in the Forest Plan that identifies standards and guidelines for management of sensitive species (1987, 4.35-4.37; app. E), such conflicts would be resolved in ways that attempt to maintain both Indiana bat and the RFSS at issue. We currently do not anticipate any irreconcilable conflicts between Indiana bat guidelines as proposed and RFSS management goals. Although there may be theoretical benefits to species requiring snags, our list of RFSS does not currently include any species with documented requirements for this habitat feature.

As was the case in Alternative 1, species listed as sensitive will be afforded the protection that is defined in the Forest Plan (1987, 4.35-4.37; app. E). In addition, as for Alternative 1, Forest Service policy requires biological evaluations to be completed on all projects with the potential to impact sensitive species. Consequently, sensitive species associated with project areas will be protected under this alternative and are not likely to be lost from the Forest due to actions we take on their behalf or on the behalf of other programs.

For all current Region 9 sensitive species, and those species that remain on the Forest's list of Species of Concern, modification and reorganization of the information regarding these species in the Forest Plan will have little to no impact directly on these species. If there is an impact at all, it will be beneficial, in that Regional goals and GMNF objectives will be more clearly articulated within the Forest Plan, and so will heighten awareness and understanding of the RFSS program and the Forest's responsibility regarding viability of rare species.

This alternative also proposes to maintain the list of protected species on the GMNF website and at each office, rather than in the Forest Plan; it also proposes to produce a yearly list of protected species that will be available to the public and reported on in the annual Monitoring and Evaluation Report. This change will have no negative impact to current RFSS or to Forest Species of Concern. Maintaining a current list in publicly accessible places and updating it annually will serve the needs of these species more effectively by helping our partners and the public keep up with changes in this dynamic area.

The proposal eliminates some Species of Concern, removing only those species that are not known to exist nor appear to have suitable habitat on the National Forest. The proposal also eliminates the

Species of Uncertain Occurrence list. These actions will have no affect on these species, as they are not known or likely to occur. As the Forest Plan never included language to protect these "uncertain" species if found, the list was essentially meaningless in terms of species conservation. However, the proposal also includes a new standard and guideline that provides protection to any newly discovered species that is of conservation concern (e.g. state listed, RFSS). This ensures that future conservation options for these species are not precluded by inadvertent damage simply because they were being evaluated and had not been designated sensitive yet.

Changes in what resource outputs and monitoring activities are expected related to RFSS may have the beneficial effect of defining a more realistic set of outputs that the Forest and the public can evaluate in the annual monitoring report. Instituting a more formal monitoring program for RFSS will provide beneficial impacts to RFSS by keeping a closer watch over these populations so that declines in population numbers or vigor can be detected quickly. Having clear expectations in the Forest Plan regarding monitoring, inventory and conservation actions will help us to secure the assistance of volunteers and organizations more effectively. In particular, regular monitoring will help us to determine if populations are increasing, stable, or declining further, and will be the only mechanism we can use to determine that species are no longer of viability concern.

Overall, then, we conclude that there will be additional beneficial impacts to RFSS as a result of this alternative as compared to the Alternative 1. However, there will still also be potential negative impacts, but they are not likely to lead to loss of viability or trend towards federal listing (see also appendix 2)

Alternative 3: Proposed Action with Conservation Measures

The addition of Conservation Measures for Indiana bat does not add any guidance that changes the effects on RFSS from those described for Alternative 2. In addition, the RFSS update proposed does not change in this alternative from Alternative 2. Consequently, the impacts to RFSS will be the same as for Alternative 2.

Alternative 4: Proposed Action with No Summer Timber Harvesting

Beyond the impacts to RFSS described for Alternative 2, the addition of no summer timber harvest will have a beneficial, although minor, effect on this group as a whole. We currently have no indication that any RFSS derives a distinct benefit from harvest conducted in the summer, rather than in the winter. However, harvest conducted in the summer, during the growing and breeding season for all RFSS, has always had the potential to impact individuals and small populations by way of direct impacts from felling and skidding operations. Because RFSS animals tend not to be stationary, these direct impacts tend to be unpredictable and unlikely to contribute to loss of viability of these species. For RFSS plants, however, their stationary existence poses greater risks of population loss from such impacts. Consequently, eliminating the summer logging risk altogether will provide a benefit to most RFSS species with whom this conflict arises. The benefit is minor, though, since it has been routine to mitigate potential impacts to RFSS through recommending frozen ground harvesting. In addition, the alternative does not preclude logging on unfrozen ground in late fall, which will still have the potential to have direct impacts to rare plant populations that happen to exist in a harvest unit. We will continue to recommend frozen ground logging for areas around known RFSS plants in those circumstances where it is not necessary to avoid the population altogether. In summary, then, there are additional beneficial impacts of this alternative to RFSS, and reduced negative impacts. However,

there is still the potential for negative impacts, but they are not likely to lead to loss of viability or trend towards federal listing (see also appendix 2).

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

There are no additional impacts, beyond those discussed previously for Alternatives 2, 3 and 4, on RFSS species as a result of implementing this alternative. This alternative does not add new guidance that is different from the previous alternatives, and there does not appear to be a cumulative benefit or impact to RFSS from combining them. As the RFSS update proposed does not change in this alternative, impacts to sensitive species as a result will be the same as for Alternative 2.

Cumulative Effects

The discussion that follows will pertain primarily to Indiana bat, as no other TES species were determined to be adversely impacted by the Proposed Action or any alternatives. Analysis of cumulative effects is also contained within appendix 2.

Indiana bat – *Myotis sodalis*

Alternative 1: No Action

The Forest Plan, as currently written and implemented, provides quality habitat for Indiana bat, but there is still a chance that specific Forest activities could result in incidental "take" as defined by the ESA. By not incorporating the mandatory terms and conditions from the BO, we effectively will be using existing Forest Plan guidance and incidental standards and guidelines as we develop and review individual projects. Consequently, the chance for incidental take would still remain. There are also long-term repercussions of implementing this alternative in terms of the illegality of such an action under the ESA, and the negative effects on relationships with partner conservation agencies and organizations.

Additionally, not incorporating these mandatory terms and conditions will make it difficult to gain understanding of Indiana bat habitat relationships in New England, at the broad-scale, landscape level. This alternative limits assurance that habitat conservation will be coordinated at the GMNF level, and perhaps beyond.

Alternative 2: Proposed Action

Incorporating the mandatory terms and conditions of the BO, reduces the chance that incidental take will occur. This means there is even less potential to harm individual(s), than under Alternative 1.

Habitat components considered important for Indiana bats will be conserved throughout the GMNF, theoretically improving both local and landscape level conditions for this species.

Alternative 3: Proposed Action with Conservation Measures

This alternative provides for enhancement of potential roosting habitat throughout the GMNF. It also focuses energies into better understanding bat habitat relationships and in sharing this knowledge with others, Forest employees and neighbors of the Forest included. The enhancement to potential roosting habitats is limited to those areas being actively managed, which in itself limits the degree to which this

alternative improves on management resulting from Alternative 2 – some, but not a lot. The greater enhancement will be in the broadening and deepening of the knowledge base specific to Indiana bats in New England, and sharing this information and knowledge with employees and neighbors. This latter effort has the potential to enhance Indiana bat conservation throughout New England, assisting in this species recovery.

Alternative 4: Proposed Action with No Summer Timber Harvest

In addition to incorporating the mandatory terms and conditions of the BO, thereby reducing the chance that incidental take will occur (see discussion above), this alternative further reduces the chance that incidental take will occur by eliminating all timber harvest during periods when Indiana bats could be present. Without a better understanding of Indiana bat habitat relationship and degree of use of GMNF habitats, it is difficult to determine how beneficial this reduction would be. Because of the measure's cumulative limitation to strictly GMNF ownership, any enhancement will be constrained to the relatively small acreage the Forest manages for timber. This degree of enhancement is not likely to be detectable to Indiana bat recovery across its range, or even in New England or the Northeast.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvest

The cumulative effect of this alternative is essentially a combination of those projected for Alternatives 3 and 4. Additionally, a small enhancement of potential roosting conditions could occur through the greater retention of potentially suitable roost trees during all timber harvest operations. Again, the benefits of this relatively limited addition is difficult to assess – the physical restrictions of GMNF ownership limiting the degree of landscape level enhancement.

Regional Forester's Sensitive Species

Alternative 1: No Action

For the purposes of this alternative, past, present, and reasonably foreseeable future actions are defined by the Forest Plan. As discussed earlier and in detail in the programmatic BE (USDA 2000c), such actions as have been taken to protect RFSS will likely continue, as will partnerships with State agencies and conservation organizations with an interest in rare species conservation. The continued divergence of the Forest Plan language from actual TES policy, objectives and accomplishments will eventually lead to problems with credibility. Credibility will become increasingly dependent upon the good will relationships of Forest TES program managers with partners. Without more precise goals and objectives in the Forest Plan for RFSS, we will be less accountable to the public for rare species conservation. Species may decline without detection, although most likely due to factors beyond GMNF control. Overall, however, the handful of gaps in the Forest Plan are not likely to contribute to loss of viability of any of the RFSS, as we do not anticipate any great changes in Forest Plan implementation or program direction prior to Forest Plan revision.

Alternative 2: Proposed Action

Updating the Forest Plan to reflect the most current information regarding FS guidance on T&E, RFSS, and special concern species conservation will serve to improve the Forest's credibility in this program area, and may help to identify conservation actions that could be taken to move beyond

simple protection of rare species to improvements in habitat conditions. Such guidance in the Forest Plan will help broaden the potential reservoir of citizens interested in species conservation activities on the Forest, and may ultimately result in reversing real or apparent declines in species populations. Consequently, we anticipate a small cumulative benefit to RFSS as a result of this proposal. There do not appear to be any cumulative impacts to sensitive species related to the proposed Indiana bat changes or additions in this amendment, as there did not appear to be any direct or indirect impacts on which to base cumulative impacts.

Alternative 3: Proposed Action with Conservation Measures

We do not anticipate any additional cumulative effects from this alternative on RFSS, beyond those discussed for Alternative 2.

Alternative 4: Proposed Action with No Summer Timber Harvest

Beyond those effects described for Alternative 2, there may be an additional cumulative benefit from eliminating summer timber harvesting, simply by reducing over time the likelihood of conflicts with sensitive plant and animals. However, such conflicts are usually mitigated, so the overall benefit is minor.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvest

We do not anticipate any additional cumulative effects from this alternative on RFSS as a group, beyond those discussed for Alternative 4.

Wildlife Management Program

Affected Environment

There are approximately 350 vertebrate fish and wildlife species inhabiting the GMNF. Among these are several species that are listed as federally threatened or endangered or proposed to be listed. These species are the primary focus of this assessment.

A full discussion of the wildlife habitat capability can be found in the Forest Plan FEIS pages 1.27 through 1.30, 2.50 through 2.61, 3.14 through 3.18, and 4.60 through 4.63; the strategy for management of these habitats can be found in pages 3.03 through 3.04 of the Forest Plan.

Management of wildlife habitat requires vegetation manipulation. Accomplishing wildlife habitat management through the planning and implementation of timber sales can be a very effective as well as cost efficient method of habitat management. In most cases, of the 375,300 acres of National Forest Lands on the GMNF, habitat management is limited to the approximately 141,000 acres in Management Areas 2.1A, 2.2A, 3.1, 4.1, 4.2, and 6.2A that are available for timber harvest.

In 1999 approximately 150 acres were improved for wildlife through timber harvest. Additional wildlife enhancement projects included such things as wildlife opening maintenance, apple tree/orchard pruning and restoration, waterfowl nesting habitat enhancement, beaver wetland protection, sensitive plant habitat restoration, and peregrine falcon nesting habitat protection.

Direct and Indirect Effects

Alternative 1: No Action

The No Action Alternative is the existing GMNF Forest Plan, as amended to date, and is the direction currently guiding management of the GMNF. There would be no expected effects to the wildlife management program under this alternative. This alternative would not comply with the Terms and Conditions of the BO, and could lead to violation of the ESA by the Forest. Recognition of viability risk for newly identified RFSS animals would not be displayed in the Forest Plan, and could lead to violation of the NFMA by the Forest.

Alternative 2: Proposed Action

Under this alternative, the existing Forest Plan would be amended to incorporate the Terms and Conditions of the BO, and update rationale for inclusion of a species on the RFSS list.

Area of Influence Designation - One primary effect of this alternative would be in the areas of influence for Indiana bat hibernacula. Within these areas, the emphasis would shift from management for communities of native species to management to benefit the Indiana bat. The wildlife management would still take place within natural communities, and management would benefit species in addition to the Indiana bat, but this would be a by-product rather than the primary purpose. The management of the areas of influence for Indiana bats will not affect the amount of the various wildlife habitats provided across the Forest, but could affect the distribution of those habitats, especially those requiring certain canopy closures.

The actual extent of the areas of influence will be determined later through a separate environmental analysis. The analysis of specific effects to other wildlife species within each area of influence will be done at the time those areas are determined and management strategies developed. In order to estimate effect for this analysis, we will assume that all the NFS lands within a five-mile radius of Indiana bat hibernacula are included in the areas of influence.

There are approximately 15,000 acres of national forest lands within a five-mile radius of the one, known Indiana bat hibernacula in, or near to, the GMNF (the Dorset cave on Mt. Aeolus). This is approximately 4% of the total NFS lands in the Forest. Management activities within these areas would emphasize creating and managing habitat for the Indiana bat. Within this area of influence, an abundance of den trees, cavity trees, large dead trees with loose bark will be available. This will benefit other wildlife species that depend on cavities or loose bark to find shelter and breeding/nesting sites. Examples of these species include: woodpeckers, flying squirrels, raccoons, chickadees, nuthatches, brown creepers, flycatchers, screech owls, barred owls, wood ducks, red bats, northern long-eared bats, and silver-haired bats.

Within the areas of influence, it is likely that some areas will be maintained in forest with canopy closure of 60% to 80% to provide good foraging habitat for Indiana bats. Other wildlife species that also use this type of open-canopy woodland include: eastern wild turkey, silver-haired bat, great crested flycatcher, and great horned owl.

Species that prefer a closed forest canopy would tend to avoid the areas of open canopy, and choose other, more suitable areas either within or outside the Indiana bat area of influence. Because the

amount of closed canopy habitat would not change Forest-wide, there would be no long-term effects on populations of species using this habitat. Examples of species using closed canopy forest include; red-eyed vireo, gray tree frog, ovenbird, and scarlet tanager.

Increase in availability of potential roost trees. Perhaps the second most noticeable effect is the attention to protecting trees suitable for roosting by Indiana bats. This amendment would direct that all shagbark hickory be retained, that 1/3 of all snags remaining after timber harvest be protected by retention of nearby living trees, skid trail design would avoid the need to fell suitable roost trees, and that known roost trees would be protected until they no longer serve as roost trees. In 1999 a total of 683 acres received timber management treatments; this is less than 0.2% of the GMNF land base. The retention of these potentially suitable roosting sites will attract other cavity users (see preceding discussion); however, this limited change in conditions over such a small percentage of the GMNF is unlikely to affect noticeable change to populations of other wildlife species utilizing these potential roost trees. Even timber management levels prescribed by the Forest Plan (approximately 3500 acres/year, less than 1% of the GMNF land base) are unlikely to affect noticeable change to populations of other wildlife species.

The retention of all shagbark hickory is likely to increase availability, and diversity, of hard mast (nuts). Current Forest Plan direction recognizes the importance of mast trees for many wildlife species (see Forest Plan pages 4.31-4.33), and directs management to selectively retain trees for their mast production potential. The emphasis of this amendment for retention of shagbark hickory (because of potential as roost trees for Indiana bats) is likely to, indirectly, increase mast diversity over the long-term. This increase will be of very limited significance, as the occurrence of shagbark hickory on the GMNF is extremely limited.

The recognition of, and protection of, newly identified RFSS in and of itself has no effect to other wildlife species. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For wildlife management, this is expected to be of minimal impact. It is unlikely that the update of the RFSS list will have any significant effect on wildlife resources or wildlife management programs.

Alternative 3: Proposed Action with Conservation Measures

This alternative increases the number of potentially suitable roost trees retained during timbering activities. Current Forest Plan direction for retention of "wildlife" trees (see Forest Plan pages 4.31-4.33) would be changed to prescribe retention of approximately 25% more reserve trees per acre. Currently direction is for a minimum of 4 wildlife trees per acre; this alternative would direct a minimum of 5 suitable roost trees per acre.

As discussed for the proposed alternative, the significance of this increase is limited by the relatively small acreage receiving timber management treatments (less than .2%, actual, in 1999, and approximately 1% if the Forest Plan is fully implemented). This "difference" between management activities between the Proposed Action, and this alternative are indistinguishable.

Management of RFSS does not change with this alternative; consequently there is no difference to wildlife concerns (associated with the RFSS alternative).

Alternative 4: Proposed Action with No Summer Timber Harvesting

As previously discussed, the net effect of elimination of timber harvest during periods when Indiana bats could be present, is manifest during a 6 to 10 week period in late summer and early autumn. Currently management already limits timbering activity from snowmelt to the middle of July, to protect soil and water resources. We recognize that timbering activities that occur while a majority of our wildlife is active (i.e., non-winter periods) holds potential for inadvertent effect to individual animals inhabiting timber harvest areas. Examples include adult amphibians and reptiles that have dispersed from their natal sites, late nesting songbirds, and denning/nesting mammals. Effects associated with these summer timber activities range from incidental death of individual animals to disturbance associated with human presence.

Our recent effort to update the RFSS list assessed the risk of continued presence and viability for all wildlife species known to inhabit the GMNF. This risk assessment included risk associated with management activities (e.g., timber harvest) and determined that under the current Forest Plan direction there are no wildlife species for which summer timber harvest (as currently conducted) jeopardizes their continued existence on the GMNF. This alternative holds potential to reduce negative effect to individual wildlife; however this reduction is insignificant and likely undetectable when compared to current Forest Plan direction.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

This alternative combines measures, and effects, discussed previously (see discussion about for Alternatives 3 and 4). While the retention of additional suitable roost sites for Indiana bats, and the elimination of summer timbering activities do affect some wildlife species, and individuals, it is felt that these effects do not differ significantly from current Forest Plan direction (when considering non-TES wildlife species).

Cumulative Effects

The Forest Plan implementation from 1987 to 2000 has resulted in a mix of habitat types dispersed across the GMNF. These habitats support a wide variety of wildlife species, from those needing open lands to those requiring all successional stages of forest. Reasonably foreseeable actions resulting from implementation of any of the alternatives might affect the spatial distribution of certain canopy covers, and availability (location and density) of habitat components associated with dead/dying trees and hard mast. There would, however, be no significant change in the relative amounts, or availability, of these habitat types and components across the Forest. Therefore, there would be no cumulative impact to wildlife populations or the wildlife program.

Developed and Dispersed Recreation

Affected Environment

The GMNF lies within a day's drive of one-third of the Nation's population and receives about 2-3 million visitors annually. Of the 375,267 acres of NFS land there are 59,598 acres of congressionally-designated wilderness areas (Management Area 5.1) in which vegetation management is not

permitted. The remainder of the forest is available for a variety of recreational uses and developments. Each Management Area has specific standards and guidelines that must be followed.

Recreation facilities on the Forest include:

- Developed Sites
  - 12 campgrounds
  - 4 picnic areas
  - 14 day use areas (including scenic overlooks)
  - 36 shelters (on backcountry trails)
  - 1 cabin
- Trails (miles)
  - 995 miles
- Developed ski areas
  - 3 alpine ski areas
  - 6 nordic ski areas

Current recreation funds are targeted primarily at improvement and maintenance of existing facilities such as campgrounds, picnic areas, and trails (Table 4). Very little new construction of recreation facilities or trails is planned for the near future. Some reconstruction and rehabilitation work of trails and facilities is planned. Scenic overlook/vista management is an ongoing activity. Alpine and nordic ski areas, under Forest Service special-use permit, have some improvements planned within the existing boundaries.

Table 4. Estimated range of recreation management activities likely to be accomplished by continued implementation of the Forest Plan through FY2002.

Recreation Management	Unit Measure	1997	1998	1999	2000	2001	2002
Trails							
Trail Maintenance	Miles	739	720	720	480	480	480
Restoration/reconstruction	Miles	19.9	35.3	37.0	42.4	42.4	42.4
Developed Rec. Sites							
Campground/picnic sites (new)	Acres	0	0	0	0	0	0
Maintenance/improvement	Acres	150	150	150	150	150	150
Alpine Ski Areas							
Increase (expansion) of Areas	Acres	0	0	0	15	0	0

Dispersed recreation activities include driving for pleasure, hunting, fishing, hiking, camping, picnicking, horseback riding, and other motorized and non-motorized forms of recreation.

Information regarding recreation on the GMNF can be found in the Forest Plan Record of Decision, and the Forest Plan at pages 4.39-4.58.

Direct and Indirect Effects

Alternative 1: No Action

This alternative is the existing GMNF Forest Plan, as amended to date, and is the direction currently guiding management of GMNF. No programmatic amendment would be added and Terms and Conditions of the BO would not be considered in site-specific project implementation. Since there would be no change to existing standards or procedures, there would be no significant effect on developed or dispersed recreation under this alternative.

This amendment would not comply with the Terms and Conditions of the BO, and could lead to violation of the ESA by the Forest.

Alternative 2: Proposed Action

Under this alternative, the existing Forest Plan would be amended to incorporate the Terms and Conditions of the BO.

Implementation of this alternative will have very little direct effect on the recreation resource on the GMNF, but could have some effect on design, methods and timing of maintenance, rehabilitation and development of recreation facilities and trails.

Implementation of the Terms and Conditions will increase the level of planning and coordination needed during project development for trail and recreation facility rehabilitation. This effect is expected to be manageable since we are already required to complete environmental reviews, including biological evaluations. There may be a slight increase in project unit cost as a result of these additional reviews, but this should be something we can manage by improving efficiencies in our processes.

The increased protection of roost trees, and similar habitat protection measures, could affect the design and implementation of individual trail relocations, facility rehabilitation and other projects. Since the Forest Plan doesn't call for a large amount of new development, these effects should be relatively insignificant. It is expected that most issues can be resolved in the design phase through avoidance or by adjustments in the timing of implementation. Needed timeframes for project planning might increase somewhat. In rare instances, individual projects might be stopped if the habitat was deemed important and there were no reasonable alternatives to the proposed design. Given that most of the recreation and trail work on the Forest is rehabilitation of existing facilities, the effects of this alternative should not be significant to the overall recreation and trails program.

Protection measures near the known hibernaculum, and any potential maternity sites, could have some effect on recreation use in those areas. The true effects of restrictions on use of these sites will be determined during development of management strategies. These strategies might restrict recreational use or preclude projects, within the areas of influence. Due to the limited number of known hibernacula (one) and no known maternity sites, the effects of these strategies aren't expected to be significant to the overall recreation resource.

Hazard trees, within developed recreation areas, may still be removed under the Terms and Conditions, but under more restricted conditions. This will require increased coordination with biology staff and the Fish and Wildlife Service. Due to this, operations costs could increase somewhat and it may be necessary to change the timing of some of our routine recreation site operations. These changes are not expected to significantly affect overall developed recreation site activities.

It is unlikely that the update of the RFSS List will have any significant effect on recreation resources or recreation and trail management programs. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For recreation management, this is expected to be of minimal impact.

Alternative 3: Proposed Action with Conservation Measures

In addition to the Proposed Action described above, this alternative includes conservation measures that would benefit Indiana bat habitat and habitats for other woodland bat species. These measures would also increase monitoring for bats and bat habitat. In addition we would increase our Education and Outreach efforts related to Indiana bat conservation.

The effects, on the recreation resource, of implementation of this alternative would be nearly identical to the effects of Alternative 2. There would be no additional positive or negative impacts on recreation resources or management activities as a result of implementation of this alternative.

Alternative 4: Proposed Action with No Summer Timber Harvesting

To achieve the objective of minimizing take of Indiana bats, this alternative replaces terms and conditions related to summer timber harvesting by discontinuing timber harvesting during the non-hibernation period (May 15 through August 30), with the exception that the no harvesting period would be longer if harvesting were to occur near hibernacula.

All effects on the recreation resource, identified in Alternative 2 (see above) would also apply to Alternative 4. In addition there are some additional effects that would result from increased winter logging.

A portion of timber harvest on the GMNF has traditionally occurred during the summer months. Implementation of this alternative could increase the amount of winter logging on the Forest, thereby increasing the potential for conflicts between winter recreation use and the logging activities. Very often, the winter trail systems for snowmobiling and cross-country skiing are co-located with the Forest road system. When one of these roads is needed for access to a timber sale, the trail system can be disrupted. The amount of impact depends on the relative use of the trail, physical location of the sale, duration and timing of various harvest activities and the availability of alternatives for relocating the trail. Often the effects of individual sales can be easily mitigated, but sometimes no good choices are available. This can affect both the logger and the users of the trail system. Implementation of this alternative is likely to have some negative effects on recreation use of these trails. The effects of these conflicts vary greatly from year to year and area-to-area, therefore these effects are difficult to quantify.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

This alternative combines Alternative 3 - Proposed Action with Conservation Measures and Alternative 4 – Proposed Action with No Summer Timber Harvesting. Standards and guidelines and general direction would be as described in those two alternatives. The difference between Alternatives 4 & 5 is Alternative 5 would retain the standards and guidelines that would be deleted from Alternative 4 (see Alternative 4 above). The reason for retaining them under Alternative 5 is these two standards and guidelines are considered additional conservation measures.

The effects, on the recreation resource, of implementation of this alternative would be nearly identical to the effects of Alternative 4. There would be no additional positive or negative impacts on recreation resources or management activities as a result of implementation of this alternative.

Cumulative Effects - All Alternatives

There will be no significant direct effects on the recreation resource as a result of the implementation of Alternative 1. Effects of the other alternatives will be minor and relatively insignificant to the overall recreation resource. Minor, short-term effects on individual projects are very similar to effects resulting from routine resource coordination that has taken place on the GMNF for years. It should be expected that these adjustments in our processes would not have any lasting effect on the recreation resource. There are no present or reasonably foreseeable future effects that will result from these actions.

Minerals

Affected Environment

Mineral resources can be grouped into two categories: 1) Saleable – common varieties of sand, gravel, clay, stone, pumice and other similar materials. 2) Leasable minerals – coal, oil, oil shale, gas, phosphate, sodium, potassium, sulfur… etc.

There are only a few sand and gravel operations in effect on the Forest. These are generally small pits used by the Forest Service and/or towns for the construction and maintenance of roads that provide access to the National Forest. Recreation mineral collection (gold panning) is generally allowed on the entire Forest.

The entire Forest is currently, by law, open for persons to apply for prospecting permits and mineral leases except that mineral development and surface disturbing exploration are prohibited within established wilderness areas. Also, lands with sensitive environmental conditions are closed to surface disturbing activities (see page 4.81 of the Forest Plan). Future permit or lease applications would be addressed as a site specific project and require a biological evaluation and consultation should any potential effects to federally listed species be identified.

Direct and Indirect Effects

Alternative 1: No Action

This alternative is the existing GMNF Forest Plan, as amended to date, and is the direction currently guiding management of the GMNF. There would be no effects on the minerals program with this alternative.

This alternative would not comply with the Terms and Conditions of the BO, and could lead to violation of the ESA by the Forest.

Alternative 2: Proposed Action

Under this alternative, the existing Forest Plan would be amended to incorporate the Terms and Conditions of the BO.

Protection of Den Trees, Roost Trees, Hibernacula and Maternity Sites - All mineral activities that disturb the land surface require site-specific environmental analysis, including an evaluation of the effects on threatened and endangered species. In the event that roost and den trees exist in the project area a site-specific analysis would determine whether the proposed project would need to be relocated or whether it could be mitigated. If the proposed project could not be relocated, the Forest could consult with the FWS to determine if they could be removed.

A minimal effect on the minerals program would be expected from the protection of den trees, roost trees, hibernacula and maternity sites.

Area of Influence Designation - The main effect on the minerals program under this alternative would be due to the areas of influence around Indiana bat caves. The actual extent of these areas of influence, and the management strategy for them will be determined later through a separate environmental analysis, although, in the interim, a minimum radius of five miles from any known Indiana bat cave will be required. In the absence of the specifics for these areas, and not knowing the management strategy, it is not possible to analyze the impacts of this on the minerals program. The proposed locations for these projects might have to be changed based on the site-specific conditions of the area. In addition, this work might be subject to seasonal restrictions, depending on their location and surrounding conditions.

RFSS List. It is unlikely that the update of the RFSS List will have any significant effect on mineral resources or programs. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For minerals, this is expected to be of minimal impact.

Alternative 3: Proposed Action with Conservation Measures

This alternative is the same as Alternative 2, except that it includes conservation measures that would benefit Indiana Bat habitat and habitats for other woodland bat species. It would also increase monitoring for bats and bat habitat as well as increase education and outreach efforts related to Indiana

Bat conservation. The effects of this alternative would be the same as those described for Alternative 2. Therefore, the effects on the minerals program would still be expected to be minimal.

Alternative 4: Proposed Action with No Summer Timber Harvesting

This alternative replaces terms and conditions related to summer timber harvesting by discounting timber harvesting during the non-hibernation period (May 15-August 30). With no "summer" harvesting two standards & guidelines outlined in the Proposed Action were eliminated as they apply to the non-hibernation season. All other components of Alternative 4 remain the same as described in the Proposed Action. The effects of this alternative would be the same to those described for Alternative 2. Therefore, the effects on the minerals program would still be expected to be minimal.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

This alternative combines Alternative 3 and 4. Standards and guidelines and general direction would be as described in these two alternatives. The effects of this alternative would be the same to those described for Alternative 2. Therefore, the effects on the minerals program would still be expected to be minimal.

Cumulative Effects - All Alternatives

The cumulative effects analysis takes into consideration the full range of mineral activities that may be conducted from the surface of the GMNF under the current Forest Plan. This includes all past, present and reasonably foreseeable future activities connected with non-commercial gravel operations as described in the affected environment, as well as similar activities that may be occurring on private lands near GMNF.

There are no direct effects to the minerals program from Alternative 1. The only direct effects to the minerals from Alternative 2, 3, 4 or 5 is that approval of surface disturbing mineral activities may require relocation, seasonal restrictions, or limitations in the number of sites.

Past, present, or reasonably foreseeable future actions that may occur include occasions when surface disturbing activities might be altered for some reason such as heritage site protection or water quality protection. If such relocation were necessary, the cumulative impacts, when added to the direct effects of Alternative 2, 3, 4 and 5 would have a negligible impact on the minerals program.

Forest Resource Management

Affected Environment

Forested conditions are found on 95 percent of the GMNF's 375,300 acres. Seventy-one percent is sawtimber sized (generally 8" Diameter Breast Height and greater) and older than 60 years of age (Table 5; Fig. 2). Several distinct forest types are present on the GMNF (Table 5; Fig. 1) including northern hardwoods (American beech, sugar maple, red maple, yellow birch, white ash, and black cherry), softwoods (red spruce, balsam fir, white pine, red pine, and hemlock), pioneers (paper birch and aspen), oaks (red and white oak), and permanent openings (old fields, pastures, lakes, ponds, and marshes). About one-third of GMNF, (141,000 acres) is considered commercial forestland where

trees may be cut to produce the desired future condition and levels of outputs envisioned by the Forest Plan, such as improved forest growth, health, and species diversity. Between 1987 and 1996, approximately 1,900 acres of forested land each year received silvicultural treatments that moved the forest toward a desired future condition.

Table 5 - Forest types and age classes on the Green Mountain National Forest, VT, 1999.

Forest Type	Acres	%
Northern hardwoods	310,835	83
Softwoods	29,960	8
Aspen & Paper Birch	18,725	5
Openings	11,235	3
Oak	3,745	1

Age Class (years)	Acres	%
0-19	18,725	5
20-39	18,725	5
40-59	26,215	7
60-79	71,155	19
80-99	101,115	27
100+	93,625	25
Uneven age	44,940	12

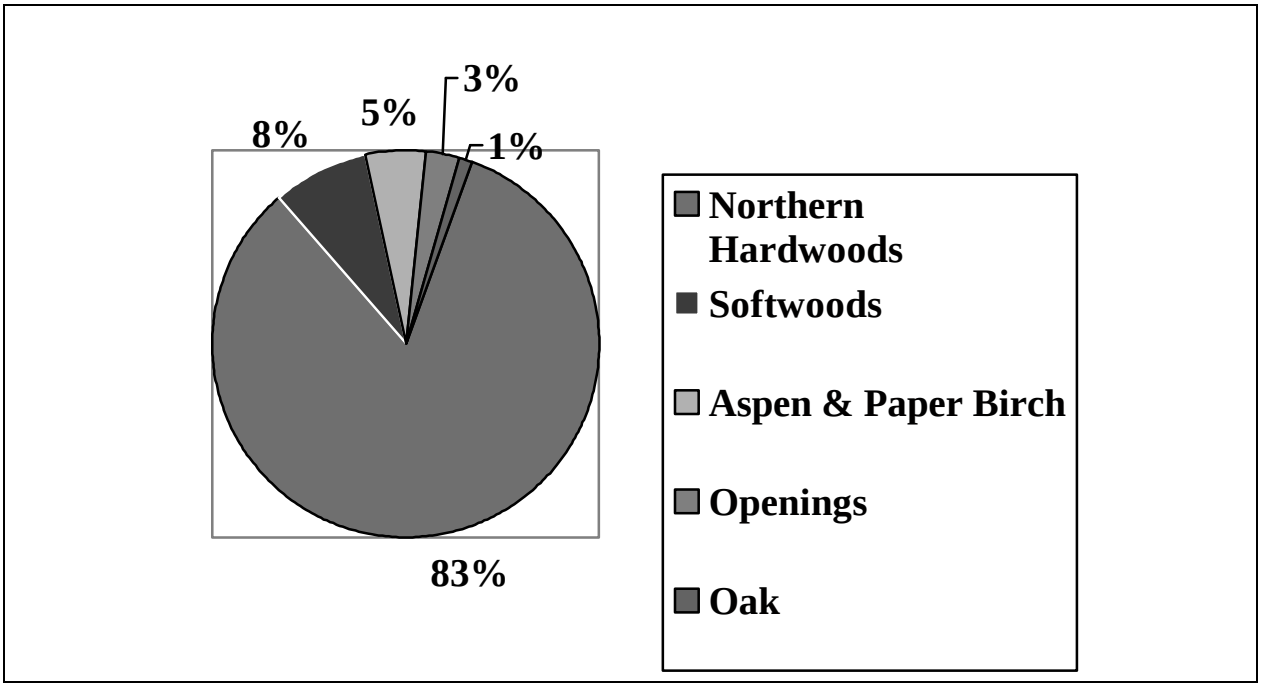

Fig. 1. Percent of total forest land by forest types on the Green Mountain National Forest, Vermont, 1999.

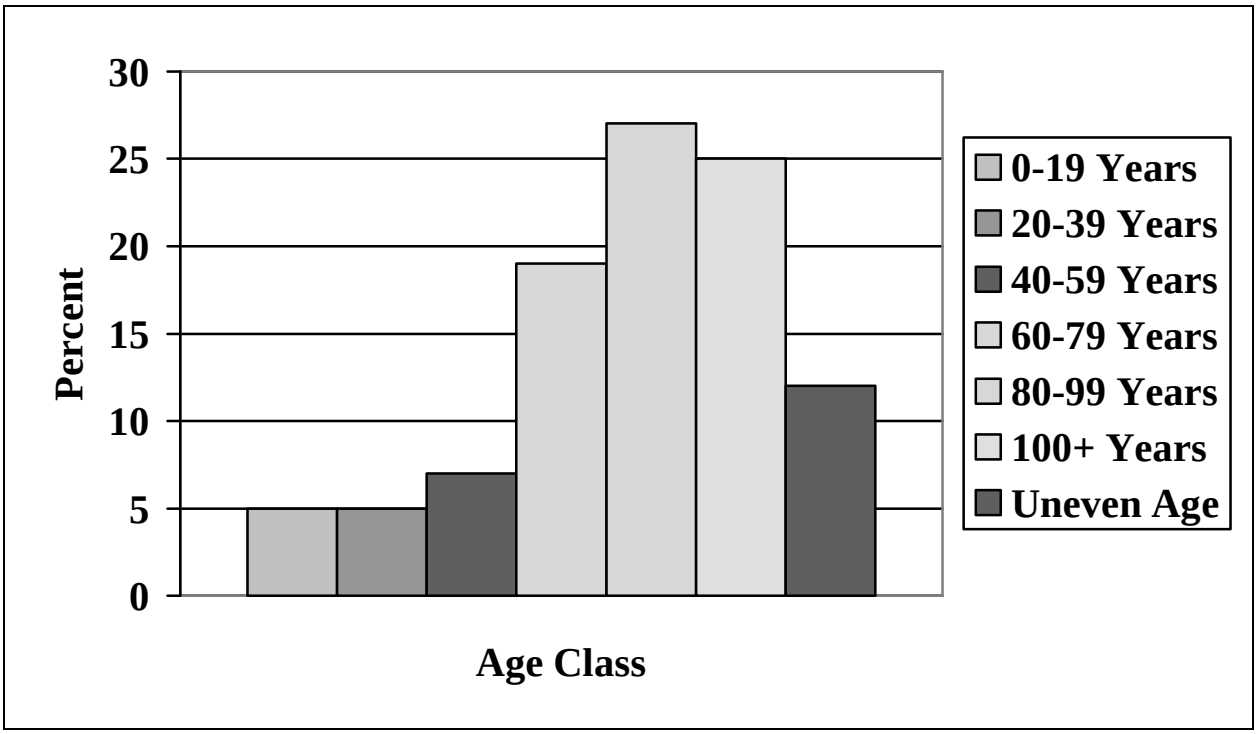

Figure 2. Percent of total forest land by age class on the Green Mountain National Forest, Vermont, 1999.

Forest Management Methods

Several types of silvicultural methods are applied in forested stands to produce the desired future condition and levels of outputs envisioned by the Forest Plan for a management area (USDA 1987). Both even-aged and uneven-aged management systems are considered on the GMNF, with the ultimate selection of a specific treatment based upon the long-term Forest Plan objectives for the management area and the resource conditions that exist within the stand (Table 6). Regarding wildlife habitat management, current Forest Plan standards and guidelines require that *4 to 8 den and snag trees per acre be retained during all silvicultural treatments.*

Table 6. Estimated range of silvicultural activities accomplished in fiscal years 1997-1999 and likely to be accomplished by continued implementation of the Forest Plan through FY 2002.

Silvicultural Treatment	Unit Measure	1997	1998	1999	2000	2001	2002
Clearcuts	Acres[a]	100	30	30	60	30	30
Shelterwood	Acres	150	650	200	150	250	250
Intermediate even-age	Acres	450	450	250	300	450	450
Selection cut	Acres	350	350	550	450	500	500
Non-commercial thinning	Acres	0	100	100	250	250	250

[a]An acre is an area about the size of a football field, excluding the end zones.

Even-aged silvicultural techniques are used where long-term objectives are to manage for trees that are relatively close in age (+ or - twenty years), for an established length of time (rotation age), with

the eventual intention to establish a new stand of seedling regeneration to replace the trees currently in place. This type of management can be accomplished by applying a series of commercial and noncommercial treatments throughout the life of the stand, some of which take place during the initial phases of stand development (regeneration treatments, precommercial thinnings), some during the mid-life of a stand (intermediate thinnings, timber stand improvements) and some nearing the rotation age for the stand (reforestation treatments to establish seedlings, regeneration harvests such as shelterwoods or clearcuts). For the most part, seedlings are produced through natural regeneration processes. Sometimes, artificial regeneration (planting) is used when seed source is lacking or seedlings fail to develop. Repeating even-aged treatments across the landscape results in a multi-aged forest composed of even-aged stands.

Uneven-aged silvicultural techniques are used where long-term management objectives are to maintain continuous forest cover with a variety of age and size classes present within the same stand. Management activities occur periodically (approximately 20 years apart) with each entry intended to establish some seedling regeneration. The objective for selecting an uneven-age treatment may vary, but often it is related to visual, recreational or site (wetness) concerns. The factors considered in the application of an uneven-aged harvest are the same as those considered in even-aged - stand density, stand structure and species composition - however the type of structure and composition are quite different than those sought under even-aged treatments. Three types of uneven-aged treatments are used: improvement cuts, individual tree selection, and group selection (appendix 5). Often individual tree and group selection are used together in the same stand.

Firewood is removed from the Forest in fairly small quantities. Between 50 and 150 personal use firewood permits are sold each year. Permits may be purchased for quantities of from two to ten cords. The majority of permits are issued for the minimum of two cords. Cutting of standing dead is not permitted without specific written authorization. Prior to authorization a field inspection may be conducted and specific trees marked for harvest. Cutting of dead and down trees is permitted within 150 feet of an open Forest Service road except in Wilderness areas, developed recreation areas, and active timber sales.

Direct and Indirect Effects

Alternative 1: No Action

This alternative is the existing GMNF Forest Plan, as amended to date and is the direction currently guiding management of the GMNF. Under this alternative, vegetation would be managed using existing standards and guidelines found in the Forest Plan. There would be no direct and indirect environmental effects on forest management with this alternative. These effects are described in the Forest Plan FEIS, and supported by monitoring since that time. Monitoring has found the current standards and guidelines protect threatened, endangered and sensitive species (USDA 1997a, 66).

Alternative 2: Proposed Action

Changing the definition for “den tree” to minimize the likelihood of a take regarding Indiana bat would not lead to any changes in the direct and indirect environmental impacts on forest resources. Including trees with exfoliating bark as a feature to help identify and select den trees would not be a large change from the current method den trees are identified and selected. Specific species such as

shagbark hickory have good exfoliating bark but are very limited in range on the forest. Currently, shagbark hickory is seldom cut, because it has great wildlife value as a mast tree.

Protecting any discovered Indiana bat roost trees would have a small, immeasurable effect on overall forest growth and health. For example, active and potential den and nest trees for raptors are routinely identified in the field and protected from human disturbance by excluding them from timber sale areas or by utilizing seasonal harvesting restrictions or both. Ten years of forest monitoring (1987-1996) has shown that current silvicultural activities successfully improve forest growth and health, even with den and nest tree protection measures.

GMNF has recently averaged about 300 acres a year of summer harvest. Current Forest Plan direction requires a minimum of 4 trees per acre be reserved from cutting for wildlife reasons. Under this alternative, 1/3 of all snags in areas harvested during the non-hibernation period would be protected by not cutting live trees adjacent to these snags. In this analysis, these trees will be called "guard trees". Guard trees are trees that grow around the perimeter of a den or snag needing protection from logging disturbance. Crowns (uppermost branches of trees) of guard trees in many cases touch the crowns of trees needing protection. Guard trees are of suitable size and height to provide protection of wildlife trees in this alternative.

Suitable protection would occur by protecting 2 snags (of the currently required 4 den and snags per acre) with 3 guard trees each. Therefore, for each acre treated during the non-hibernation period, at least 10 trees per acre would be reserved from cutting in this alternative (4 den and snag trees, plus 6 guard trees).

For forest areas treated with a shelterwood or delayed shelterwood cut during the non-hibernation period, leaving 10 trees per acre for wildlife instead of 4 would have little or no change in the composition of tree species regenerated in these cuts. This approximates current leave tree strategy to regenerate these stands. Reproduction underneath the reserve trees might be slightly undersized due to the competition for sunlight and minerals, however across an entire acre of harvesting, this effect would be minimal.

For forest areas treated with a clearcut during the non-hibernation period, leaving 10 trees per acre for wildlife instead of 4 may slightly change the composition of tree species regenerated in these cuts. If low quality northern hardwoods were being clearcut in an effort to regenerate a healthy, vigorously growing northern hardwood stand, trees which need high levels of sunlight (yellow birch, white ash, black cherry) may not regenerate as well in this alternative. Instead, a higher proportion of seedlings of shade tolerant species (sugar maple, American beech, red maple) would likely occur in this alternative.

Similarly, clearcuts during the non-hibernation period designed to regenerate softwood, may not achieve desired results. Leaving 10 trees per acre for wildlife instead of 4 would create slower growing conditions for seedlings planted underneath reserve trees due to the competition for sunlight and minerals. White pine planted underneath the reserve trees might be slightly undersized due to the competition for sunlight and minerals. White spruce would fare better than white pine in this alternative as the species can tolerate partial shade as seedlings.

Leaving 10 trees per acre for wildlife instead of 4 in areas treated by thinning, selection cutting, group selection cutting, and improvement cutting would have no little or no change in the composition of tree species regenerated in these cuts. This is because these types of cuts remove relatively few trees, leaving most trees free to grow. Those that are left could easily fulfill the wildlife requirement for den and snags in this alternative.

Skid trail location under this alternative would have no change in environmental effects from the existing condition. For several other environmental protection reasons, existing and future timber sale contracts require that seller and purchaser must mutually agree to location of skid trails. Proper skid trail location prior to use by logging machinery would protect identified roost trees.

Maternity sites found through monitoring would be protected in this alternative. The GMNF, in cooperation with FWS and the Vermont Department of Fish and Wildlife, would establish protective measures immediately upon discovery. Environmental effects to forest management resulting from these protective actions are unknown. After two summers of woodland bat surveys on GMNF, no maternity sites have been found. If maternity sites are found, then protective measures within a zone centered on the maternity roost site are not expected to cause large-scale changes to the forest management program on GMNF.

Area of Influence - An area of influence would be established, extending five miles in radius from the Mt. Aeolus Cave hibernaculum. The GMNF along with the FWS and Vermont Department of Fish and Wildlife would develop on or before February 16, 2002, a management strategy for Indiana bats that would apply to this area or zone of influence. The management strategy would specify vegetative objectives and practices beneficial to Indiana bats. It may also be determined for that a larger radius is needed. Due to planned monitoring, other hibernacula may be found. The environmental effect on forest vegetation of this management strategy is unknown, as such a strategy is yet to be developed, and the components are as yet undetermined.

RFSS List. It is unlikely that the update of the RFSS list will have any significant effect on forest vegetation or forest management programs. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For forest management, this is expected to be of minimal impact.

Alternative 3: Proposed Action with Conservation Measures

In addition to the Proposed Action described above, this alternative includes conservation measures that would benefit Indiana bat habitats and habitats for other woodland bat species. Two items in the Conservation Measures may have environmental effects to GMNF's Forest Management Program:

1. A plan that would assess the number of suitable roost trees for Indiana bat and the amount of preferred foraging habitat available.

2. Retain 5 trees of suitable roosting quality per acre harvested.

The direct environmental effects on forest resources of a plan that determines the suitable habitat for Indiana bat is unknown. The plan may find suitable habitat lacking, about correct, or over abundant.

In areas where tree cutting is prescribed to achieve Forest Plan objectives, reserving 5 snag trees per acre instead of 4 (as in the Proposed Action) would have similar environmental effects to forested stands as that described in Alternative 2. Across an entire acre of cutting, the shading effect of 1 additional snag tree on regeneration would be minimal and the effect would be as described in Alternative 2.

The effects of the RFSS list will be the same as described for Alternative 2.

Alternative 4: Proposed Action with No Summer Timber Harvesting

This alternative would be like the Proposed Action except, to achieve the objective of minimizing incidental take of Indiana bats, this alternative would prohibit silvicultural treatments from May 15 through August 30, with the exception the period would be longer if planned cutting of trees were to occur near hibernacula. The two standards and guidelines outlined in the Proposed Action would be eliminated as they apply to the non-hibernation season only.

There would be little to no negative effect on the types of species regenerated if summer tree cutting were restricted for northern hardwood forests. There is little to no difference in species composition when comparing northern hardwood regeneration in stands harvested in the winter versus the summer, although the relative composition of the component species may vary with the season of harvest (Tubbs and Reid 1984). However, with large seeded species like oak, it appears that late summer/fall logging operations tend to mix the acorns into the soil better than winter operations. This appears to lead to less acorn predation and provide for better germination success. The successful establishment of white pine seedling appears to be more favorable after a summer/fall operation due to the preparation of a more favorable seedbed than a winter operation.

The effects of the RFSS list will be the same as described for Alternative 2.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

This alternative combines Alternative 3 - Proposed Action with Conservation Measures and Alternative 4 – Proposed Action with No Summer Timber Harvesting.

The environmental effects for this alternative would be the same as those disclosed for Alternative 3 and Alternative 4.

Cumulative Effects

The cumulative effects analysis that follows determines the magnitude and significance of the environmental consequences of the proposed action (and its alternatives) in the context of the cumulative effects of other past, present, and future actions. This analysis takes into consideration each alternative and determines the realistic potential for the forest resource to sustain itself in the future. Forest Plan monitoring has found the effects of past and present silvicultural treatments in Alternative 1 essentially agree with that described in the FEIS for the current Forest Plan.

However, if Alternative 1 were implemented, it would not comply with the Terms and Conditions of the BO. It is reasonable to foresee that some could view this as a violation of the ESA. Violation of

this Act would likely result in legal proceedings that could result in an interruption of forest management activities where timber is harvested. This interruption could last several months as long as 4 or 5 years. A long interruption may have some negative effects on our ability to treat areas damaged through catastrophic events such as fire, insects, disease, windthrow, or hurricanes.

Reasonably foreseeable future actions are those described in the affected environment section. Alternatives 2 and 3 would have a slight cumulative effect to forest growth and species diversity because both alternatives permit summer harvest and a requirement to leave guard trees. Additional guard (reserve) trees required in units harvested during the non-hibernation season would result in slightly higher proportion of seedlings of shade tolerant species (sugar maple, American beech, red maple) regenerating following even-aged harvest. This would affect up to 300 acres each year of the 141,000 acres of forest eligible for timber harvest.

No summer harvest would occur in Alternatives 4 and 5, therefore there would be slight cumulative effects to regeneration of red oak and white pine on GMNF. Season of logging affects the amount of ground disturbance; summer/fall logging generally creates the most scarified area and winter logging over frozen ground or snow cover creates the least amount of soil mixing. Timber harvest in late summer/fall tends to mix the red oak acorns into the soil better than winter operations. The successful establishment of white pine seedlings appears to be more likely after a summer/fall harvest due to the preparation of a more favorable seedbed than occurs during a winter operation. Cumulative effects of Alternative 4 are very similar to Alternative 5 and are not significant.

All action alternatives contain a requirement for developing a management strategy for GMNF lands that fall within a 5-mile radius of an occupied Indiana bat hibernaculum. Currently, there is one known Indiana bat hibernaculum that meets this criterion. Located on private land, its 5-mile radius includes 6,980 acres of GMNF forestland that could be treated by timber harvest. Because we are uncertain about the future environmental effects of this plan, we therefore cannot determine any cumulative effect the plan may have on GMNF forest resources. Similar silviculture activities that may be occurring on lands near GMNF are not expected to create adverse or beneficial change to forest growth, health, or diversity on GMNF forest lands. Therefore, no significant cumulative effects to forest management were determined in this analysis. Future forest management would treat about the same amount of acres as in the past (Table 6). Minor differences in cumulative effects between alternatives occur in areas treated with even-aged silvicultural techniques. No differences between alternatives occur in areas treated with uneven-aged silvicultural techniques. This is because uneven-aged cuts remove relatively few trees, leaving most trees free to grow. Those that are left could easily fulfill the wildlife requirement for den and snags in each action alternative.

Lands adjacent to GMNF would not be impacted by these alternatives. Forest Inventory and Analysis (FIA) data from 1997 (USDA 1997b) indicates that Vermont, with 4,629,000 acres of forest land is 78 percent forested. Large diameter (sawtimber sized) stands continue to dominate the timberland area (61 percent). FIA data shows a high percentage of forest land throughout the state of Vermont contains both live and dead trees with the right size and the right species to make suitable roosting habitat for Indiana bats. Forest rate of growth continues to exceed rate of removals and it appears there will be adequate roost trees on lands outside GMNF in the future.

County Economies

Affected Environment

This analysis focuses on those counties that have national forest acres within the GMNF. The six counties that could be affected by the alternatives are: Addison, Bennington, Rutland, Washington, Windham, and Windsor. It is recognized that timber products from national forest land in one county may be transported to a sawmill or industry in a different county, and that the economies of these counties are intermingled. In order to make an estimate of the effects of the alternatives, this analysis will assume that timber produced in a county stays in that county to be processed, and the counties will be examined individually.

If negative effects on local economies were to occur from proposals analyzed in this assessment, they would be most likely to result from a reduction in timber produced from national forest lands. For this analysis, the effects of a reduction in timber production will be estimated at the county level by displaying and comparing three primary factors:

1. The percentage of the overall earnings in the county attributable to lumber, wood, paper, and allied products (timber) industries (Table 7).

2. The percentage of timber products produced in the county that comes from GMNF lands (Table 8).

3. An estimate of the change in overall earnings in the county resulting from the proposed alternatives (Table 11).

Earnings Attributed to Lumber and Wood Products Industries

The percentage of a county's economy based on lumber and wood products will be examined using the U.S. Census Bureau's County Business Patterns. County Business Patterns is an annual series that provides subnational economic data by industry and is useful for studying the economic activity of small areas such as counties. Data for the series is extracted from the Business Register, a file of all known single and multiestablishment companies maintained and updated by the Bureau of the Census. For this analysis, the direct earnings reported by companies that manufacture lumber, wood products, paper, and allied products, is divided by the total direct earnings for the county. This will narrow the focus to what percentage of earnings could be affected *if timber removals from the National Forest were reduced.*

For the purposes of this analysis (Table 7), the assumption is made that the earnings generated from timber products from each of the ownerships are consistent across the board. That is to say that the earnings from logging an acre of National Forest are similar to logging an acre of private land, and that the earnings from manufacturing a board foot of timber from GMNF are similar to the earnings for manufacturing a board foot of timber from private land.

Table 7. Percent of total county earnings from timber products (based on County Business Patterns, 1996)[a].

County	Lumber and Wood Products[b]	Paper and Allied Products[c]	Total County Earnings from Timber Products
Addison	2.08%	~	2.08%
Bennington	1.13%	0.75%	1.88%
Rutland	4.88%	~[d]	4.88%
Washington	.69%	~	0.69%
Windham	3.51%	3.71%	7.22%
Windsor	1.19%	~[e]	1.19%

[a]US Census Bureau. 1996. County Business Patterns (http://www.census.gov/epcd/cbp/view/cbpview.html)

[b]Standard Industrial Code 24 is defined as "Manufacturing, Lumber and Wood Products" and includes logging, sawmills and plaining mills, industries producing millwork, veneer, plywood, structural wood members, wood containers, wood buildings and mobile homes, and miscellaneous wood products. It should be noted that this includes earnings generated by logging and processing timber products produced from private lands as well as from GMNF lands

[c]Standard Industrial Code 26 is defined as "Manufacturing, Paper and Allied Products", and includes (among others) the manufacturing of pulps from wood and other cellulose fibers, and the manufacture of paper and paperboard. It should be noted that this includes earnings generated by logging and processing timber products produced from private lands as well as from GMNF lands.

[d]Data withheld by reporting agency for confidentiality purposes.

[e]Data withheld by reporting agency for confidentiality purposes.

Timber Production in Counties that Contain National Forest Land

Timber Product Output (TPO) data was used to determine the percentage of timber products obtained from NFS lands in each county. Available GMNF data, while accurate for total annual products harvested, does not sort data by county; therefore TPO data was used in this analysis. The most recent data available for counties is from 1996 and was prepared by USDA Forest Service, Forest Inventory and Analysis (FIA) Unit.

The TPO data cited in this analysis is the basis of the timber product output estimates reported in the 1997 Resources Planning Act (RPA) assessment (USDA 1997c). The data used for this analysis is the roundwood timber products harvested, by ownership, for each county. Roundwood products include logs, bolts, or chips cut from trees for industrial and non-industrial uses, such as sawlogs, veneer logs, pulpwood, fuelwood, etc.

In order to estimate the portion of a county's economy attributable to the manufacturing of timber products removed from GMNF, the percent of total earnings from timber and wood manufacturing in 1996 (shown in Table 7) is multiplied by the percent of timber products from each county within the Green Mountain (shown in Table 8). The results are shown below in Table 9. This provides a reasonable estimate of the role of National Forest timber products in the overall county economy.

Table 8. Percentage of county timber removals by ownership (based on volume of roundwood products produced, 1996).

County	GMNF	Other Public	Forest Industry	Other Private
Addison	22.95%	11.69%	19.54%	47.56%
Bennington	75.51%	~	~	24.49%
Rutland	6.08%	6.53%	~	87.41%
Washington	~	1.36%	~	98.64%
Windham	~	~	~	100%
Windsor	2.29%	1.75%	4.91%	91.06%

Table 9. Estimated percent of earnings from manufacturing of timber products removed from GMNF (based on volume of roundwood products produced, 1996).

County	Percent earnings from timber (Table 7.)	Percent products from GMNF (Table 8.)	Estimated Percent Earnings From GMNF
Addison	2.08%	22.95%	0.48%
Bennington	1.88%	75.51%	1.42%
Rutland	4.88%	6.08%	0.30%
Washington	0.69%	~	~
Windham	7.22%	~	~
Windsor	1.19%	2.29%	0.03%

Potential Change in County Timber Volume

On the GMNF, merchantable harvest volume from summer harvest cuts that normally begin after July 15th would most likely be affected by Forest-wide habitat protection measures proposed for Indiana bats. Direction proposed for other species in this assessment would not have negative effects on local economies due to the limited scope of the proposed standards and guides on the management practices used on the GMNF.

Current Forest Plan standards and guidelines give direction for all timber management activities to retain most soft snags, and two hard snags, one den tree, and one replacement tree per acre of treated land (see Forest Plan page 4.32). Management direction proposed in any of the action alternatives of this assessment would be done in conjunction with the existing standard and guidelines for retaining snags and trees. Volume not harvested in the interest of protecting Indiana bat habitat could have potential economic effects to counties and will examined in the following sections.

Direct and Indirect Effects

The estimated percent of county-wide earnings derived from GMNF timber for counties within GMNF boundaries is less than 2 percent (Table 9). In all alternatives, there would be no indirect effects to earnings for those counties that have land outside GMNF boundaries, because they rely on sources other than GMNF for timber

Alternative 1: No Action

This alternative is the existing GMNF Forest Plan, as amended to date and is the direction currently guiding management of the GMNF. Under this alternative, vegetation would be managed using existing standards and guidelines found in the Forest Plan. There would be no direct and indirect environmental effects on forest management with this alternative. These effects are described in the Forest Plan FEIS, and supported by monitoring since that time.

Alternatives 2 and 3: Proposed Action and Proposed Action with Conservation Measures

The amount of merchantable timber that would be uncut by retaining hard snags, replacement trees, and wildlife trees within harvest units would be a very small amount, and would have a minimal or no effect on local economies around the GMNF (Table 10).

Table 10. Potential effects to county earnings from leaving guard trees (1996 dollars).

County	Total MBF Volume Harvested in Each County in 1996	Total MBF Volume in Guard Trees Alt. 2	Total MBF Volume in Guard Trees Alt. 3	Guard Tree MBF Volume as % of Total County Timber Products Alt 2	Guard Tree MBF Volume as % of Total County Timber Products Alt. 3	Leaving Guard Tree Effects to Total County Earnings Alt 2	Leaving Guard Tree Effects to Total County Earnings Alt 3
Addison	14,400	20	24	0.14%	0.17%	-$6,400	-$7,600
Bennington	13,300	61	77	0.46%	0.58%	-$27,700	-$35,000
Rutland	33,400	12	15	0.04%	0.04%	-$9,300	-$11,600
Washington	33,900	0	0	~	~	~	~
Windham	27,300	0	0	~	~	~	~
Windsor	24,600	3	4	0.01%	0.02%	-$600	-$800

In Alternatives 2 and 3, guard trees would protect 1/3 of all snags in areas harvested during summer months. Therefore, in Alternative 2, the required 400 guard trees contain about 96,000 board feet (96 MBF) scattered throughout the 300 acres of annual summer harvest. As shown in Table 10, this reduction of volume harvested is a very small amount of the Forests annual output for each of the counties. In Alternative 3, the 500 guard trees contain about 120,000 board feet (120 MBF).

Area of Influence - An area of influence would be established, extending five miles in radius from the Mt. Aeolus Cave hibernaculum. The GMNF along with the FWS and Vermont Department of Fish and Wildlife would develop on or before February 16, 2002, a management strategy for Indiana bats that would apply to this area or zone of influence. The management strategy would specify vegetative objectives and practices beneficial to Indiana bats. It may also be determined for that a larger radius is needed. Due to planned monitoring, other hibernacula may be found. The environmental effect on forest vegetation of this management strategy is unknown, as such a strategy is yet to be developed, and the components are as yet undetermined.

RFSS List. It is unlikely that the update of the RFSS List will have any significant effect on local economies. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased

number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For local economies, any reduction in harvest levels is expected to be minor and therefore of minimal impact.

Alternatives 4 and 5: Proposed Action with No Summer Timber Harvesting, with or without Conservation Measures

There would be no positive or negative economic effects in these two alternatives because no guard trees are required to be left due to no summer harvesting. However, prohibiting summer harvesting would have some negative social/economic effects to National Forest timber purchasers, timber producers, and rural communities that supply food, fuel, and logging supplies.

Timber producers generally work year around. In Alternatives 4 and 5, no GMNF summer logging could require timber sale contracts be lengthened by 1 or more years. No summer logging on GMNF would require more roads to be plowed in winter months, or the same amount of roads would be plowed, but for more winters; both effects could disrupt winter recreation opportunities. Timber purchasers would need to find other work to employ their workers and to meet the needs of their markets. This would be especially noticeable to those employed in Addison and Bennington Counties, where 23 and 76 percent of each county's timber removals, respectively, occur on GMNF (Table 8). No summer harvesting on GMNF would likely shift summer removals to other areas of Vermont which could cause disruption to woods workers families due to increased travel time to get to more distant job sites. A transfer of summer logging sites off GMNF would mean a shift in spending patterns of timber producers for fuel, food, and supplies (W. Sayre 2000, personal communication, Chairman Associated Industries of Vermont Task Force, and Partner, A. Johnson Company, Bristol, Vermont, on potential loss of summer harvest opportunities on GMNF.). Effects of this shift are unknown, however for counties in GMNF, individual vendors within rural communities of Addison and Bennington Counties would likely be affected.

The effects related to the RFSS list would be the same as described for Alternatives 2 and 3.

Cumulative Effects

The cumulative effects analysis takes into consideration the full range of forest management activities that may be conducted on the GMNF under the current Forest Plan. This includes all past, present, and reasonably foreseeable future timber management activities described previously in the affected environment section for forest resource management.

The economic effects of past and present timber management activities are the same for all the alternatives and were analyzed in the FEIS for the current Forest Plan.

This analysis examined impacts to local economies in terms of the role the National Forest timber and wood products industry plays in the economy.

In the foreseeable future, if Alternative 1 were implemented, it would not comply with the Terms and Conditions of the BO. It is reasonable to foresee that some could view this as a violation of the ESA. Violation of this Act would likely result in legal proceedings that could result in an interruption of forest management activities where timber is harvested. Most directly affected would be new timber sale harvest opportunities, thus decreasing that portion of annual county earnings that are derived from

timber harvest on GMNF. Whether or not a shift would occur to other public lands, industry lands, or private lands to replace earnings lost from GMNF timber is difficult to predict. However it should be noted that using 1996 annual earning data, up to $7,308,000 annual earnings in Vermont counties that have GMNF timber removals would be directly affected if the timber sale program were indefinitely suspended (Table 11).

Table 11. Estimated earnings from manufacturing of timber products from GMNF –1996[a]

County	Earnings from timber	Earnings from GMNF
Addison	$4,576,000	$1,050,000
Bennington	$6,054,000	$4,571,000
Rutland	$25,944,000	$1,577,000
Washington	$3,530,000	~
Windham	$34,042,000	~
Windsor	$4,789,000	$110,000

[a]US Census Bureau. 1996. County Business Patterns (http://www.census.gov/epcd/cbp/view/cbpview.html)

Direct effects to local economies as a result of Alternatives 2 and 3 that permit summer harvesting are shown in Table 10. There would be a reduction in future countywide earnings associated with these two alternatives, however this reduction is slight.

Direct effects to local economies as a result of Alternatives 4 and 5 are difficult to quantify. Loss of future summer harvest opportunities would be especially noticeable to those employed in Addison and Bennington Counties, where 23 and 76 percent of each county's timber removals occur on GMNF (Table 8).

Reasonably foreseeable future actions include a requirement for developing a management strategy for GMNF lands that fall within a 5-mile radius of an occupied Indiana bat hibernaculum. Currently, there is one known Indiana bat hibernaculum that meets this criterion. Located on private land, its 5-mile radius includes 6,980 acres of GMNF forestland that could be treated by timber harvest. The economic effect due to changes in timber harvest levels of this yet to be determined management strategy is unknown.

Since the approval of the Forest Plan in 1986, the amount of commercial timber sold each year has declined from a high of about 30 million board feet in 1985 to a low of around 2 million board feet in 1996. This analysis does not show a comparable decline on county economies during that period. Although the timber harvest has declined on the National Forest, direct earnings from the timber and wood products industry has remained relatively level in the period 1987-1996 (Table 12). The one county not showing level earnings, Windham, requested that information be withheld from industry in the Paper and Allied Products category in the year 1987. Earnings for that category were reported in 1990, 1993, and 1996, hence the larger percent attributable to wood products.

The Forest is not aware of any reasonably foreseeable future actions that would seriously reduce the commercial production of timber on GMNF or private lands, and therefore directly or indirectly affect the counties economies. Since no past or future effects on local economies have been identified, there would be no cumulative effects.

Table 12. Percent of total county earnings from manufacturing of timber products for selected years.

County	1987	1990	1993	1996
Addison	2.33%	1.98%	1.97%	2.08%
Bennington	2.20%	1.97%	2.09%	1.88%
Rutland	3.49%	3.42%	4.02%	4.88%
Washington	1.09%	0.92%	0.56%	0.69%
Windham	2.43%[a]	7.57%	6.55%	7.22%
Windsor	2.19%	1.44%	1.90%	1.19%

[a]Data withheld by reporting agency for confidentiality purposes.

Soils, Water, and Air

Affected Environment

The affected environment for the soil, water and air resources consists of all GMNF lands and the airshed above these lands. This affected environment is described in the 1987 DEIS for the GMNF Forest Plan (see DEIS pages 3.06-3.09). A summary of this follows, and updated information is presented where appropriate.

Water and soil are important components of maintaining healthy ecosystems and the plants and animals that inhabit them. Portions of seven major watersheds occur on the GMNF. Most of the forest has small, high to moderate gradient headwater streams with high water quality. Riparian areas are forested, and in general, have properly functioning ecological processes. Some high elevation lakes are being acidified due to acid deposition.

Soils on the GMNF formed primarily from acid, loamy glacial till. Soils near ridgetops are shallow and infertile, while soils on mid and lower sideslopes are moderately deep to deep, and are more fertile. Most soils are moderate to highly erosive due to steep sideslopes, and in some cases, high organic matter content. Over the past decade we monitored the effects of our management practices on the soil and water resources. We found that soil productivity and water quality has been maintained, because Forest Plan Soils and Guidelines for soil and water protection have been effective in protecting the resources (Burt 2000). Soils may be affected by acid deposition, however more research is needed to quantify the extent and importance of these impacts.

Air quality above the forest is generally good. However, visibility has been reduced due to particulate matter in the air, and high elevation ponds have been adversely impacted by acid deposition. Approximately 50% of the air pollution originates within the state, and the remainder comes from midwestern and southeastern states. Our forest management activities, such as prescribed burning, result in very minor contribution to air pollution.

Direct and Indirect Effects

Alternative 1: No Action

This action would have no effects on the soil, water and air resources. The effects to these resources would remain as described in the 1987 DEIS for the GMNF Forest Plan.

Alternative 2: Proposed Action

If this alternative is selected, proposed soil, water or air projects would be evaluated for impacts on TES species, and project specific recommendations would be followed to protect these species. This is what has been happening since mid-1999. Based on past experience, TES species protection could change the timing, extent or location of some soil and water improvement projects (projects designed to stop erosion, sedimentation, or restore riparian areas), and a small number of monitoring projects to track air quality and it's effects on forest ecosystems. Specifically, these projects could be impacted by TES protection measures when trees need to be cut or soils disturbed. Changes in the timing, extent or location of projects may occasionally result in delayed correction of erosion and/or sedimentation problems, or the inability to collect monitoring data. However, these impacts would be minor, and could be minimized by good project planning.

Examples of how two recent projects were impacted by TES protection recommendations follow. The impacts were minor, and similar impacts are expected if the No Action Alternative is implemented. First, in the fall of 2000 we proposed to install a new long-term soil moisture, temperature, and snow depth monitoring site. To install the site, a half dozen trees needed to be cut to create a small opening. To protect potential Indiana bat habitat, the timing of the tree cutting and site installation was delayed until after Aug. 31. Second, in 1999 we proposed to stabilize an actively eroding gully. To stabilize the gully a dozen trees were cut to provide material for check dams. To protect potential Indiana bat habitat we cut no trees over 9 inches in diameter having potential habitat.

Implementation of the Proposed Action could result in a slight decrease in soil disturbing activities such as timber sales and trail construction. This would have a small but beneficial effect of reducing the risk of erosion or sedimentation on the forest.

It is unlikely that the update of the RFSS List will have any significant effect on soil resources or soil resource management programs. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For soil resource management, this is expected to be of minimal impact.

Alternative 3: Proposed Action with Conservation Measures

The impacts of Alternative 2 would be the same as the Proposed Action.

Alternative 4: Proposed Action with No Summer Timber Harvesting

The impacts to soil and water improvement projects, air quality monitoring projects, and monitoring projects to understand the effects of air quality on forest ecosystems would be the same as for the Proposed Action.

The impacts to soil and water of no summer harvest would be both positive and negative. Currently only about 25% of the logging on the GMNF occurs in summer. On the positive side, winter harvest usually results in less soil compaction. On the negative side, not allowing summer harvest would extend the time a sale would be on-going, thus exposing unvegetated soils on skid and haul roads to erosion for a longer period of time. The net change in the amount of erosion, sedimentation and compaction would be minor. This is also true considering that our monitoring of timber sales shows

that the effects of logging on the soil and water resources are minor, because Forest Plan Standards and Guidelines are effective in protecting the resources.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

The impacts to the soil, water and air resources would be the same as for Alternative 4.

Cumulative Effects

The cumulative, forest-wide effects on the soil, water and air resources of implementing any of the alternatives would be minor. This is because there would be no effects to the air quality; and the total amount of erosion and sedimentation that would occur due to implementation of any alternative would be very small.

Heritage Resources

Affected Environment

Heritage Resources on the National Forest – the sites, structures, altered landscapes and other tangible reminders of past land-uses – reflect the long and widespread presence of people. Recent evidence strongly suggests that North America's earliest (human) inhabitants, PaleoIndians, were present on the Forest 10,000 years ago. Other "prehistoric" sites reflect the evolving nature of Native American society over the subsequent millennia.

Our historic period begins with New England's "discovery" by European sailor/explorers in the 16th century (or earlier). The dominant factor in the ecological history of the region is the ultimate colonization of New England in the 17th and 18th centuries by various European powers. Non-Native material remains from the 300 years of "settlement" commonly reflect the extractive economies that Euro-Americans brought with them; that is, agriculture, logging, and mining (and associated processing sites and transportation systems).

During the late 19th and 20th centuries, an additional "cultural" veneer of the by-products of recreational and residential development is deposited in the form of camps, hotels, resorts, campgrounds, trail systems (and their huts/shelters) and more.

Finally, the efforts and products of 20th century social institutions like the Civilian Conservation Corps, and the Forest Service itself, establish themselves on the landscape.

The information contained in many of these Heritage Resources is considered valuable, irreplaceable and fragile. The Forest Plan provides for the protection and management of "significant" historic properties. In addition, projects designed to enhance or investigate Heritage Resource sites are subject to Forest Plan S&Gs and NEPA review.

Direct and Indirect Effects

Alternative 1: No Action

The No Action Alternative will have no effect on Heritage Resources.

Alternative 2: Proposed Action

The Proposed Action (i.e., implementation of the Terms & Conditions of the BO) will have no direct effect on Heritage Resources.

Minor indirect effects may occur to the extent that the timing, extent, methods or design of HR site management activities (e.g., maintenance, rehabilitation, stabilization, investigation) could be modified if they are planned to occur within hibernacula protection areas or near roost or maternity sites.

Updating the RFSS List will have no effect on Heritage Resources.

Alternative 3: Proposed Action with Conservation Measures

Effects of Alternative 3 on Heritage Resources would be the same as Alternative 2.

Alternative 4: Proposed Action with No Summer Timber Harvesting

Effects of Alternative 4 on Heritage Resources would be the same as Alternative 2.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

Effects of Alternative 5 on Heritage Resources would be the same as Alternative 2.

Cumulative Effects

None of the alternatives can reasonably be seen to contribute to cumulative adverse effect to Heritage Resources.

Visual Management

Affected Environment

The Management goal for scenic quality in the Forest Plan is to "protect the outstanding natural beauty for which Vermont and the GMNF are known by designing and conducting management activities which will fit naturally on the landscape and will reflect the expectations of the people who see them." Current Forest Plan direction for the GMNF uses the Visual Management System (VMS) and identifies standards and guidelines that are related to that system. Eventually the GMNF will be converting to the Scenery Management System, but this probably won't occur until the completion of Forest Plan revision. Since the existing plan uses the VMS, this analysis focuses all discussion toward the standards and guidelines currently in use.

Visual resource management attempts to address the tradeoffs between maintaining a natural looking forest and the objectives and effects of any activity. The increasing development of the interface between National Forest and private land as well as overall growth (including recreational use) in general has led to a greater concern about visual quality.

Vista management is one of the tools used to enhance visual resources. Vistas are designed to maintain or improve scenic views along key trails and the more heavily traveled Forest roads. Creation of new vistas has been relatively sporadic due to uncertain funding. The primary activity involves the maintenance of existing vistas, especially along the Appalachian Trail and Long Trail.

Direct and Indirect Effects

Alternative 1: No Action

This alternative is the existing GMNF Forest Plan, as amended to date, and is the direction currently guiding management of GMNF. No programmatic amendment would be added and Terms and Conditions of the BO would not be considered in site-specific project implementation. Since there would be no change to existing standards or procedures, there would be no significant effect on visual resource management under this alternative.

Alternative 2: Proposed Action

Implementation of this alternative will have very little direct effect on visual resource management on the GMNF. Development and maintenance of new vistas would be slightly affected by Terms and Conditions of the BO. The design of vistas and timing of implementation could be somewhat affected due to the new standards. Due to the relatively small amount of new vista development and the characteristics of the areas receiving treatment, these effects are expected to be minimal.

It is unlikely that the update of the RFSS List will have any significant effect on visual resources or vista management programs. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of projects that need to be mitigated. For vista management, this is expected to be of minimal impact.

Alternative 3: Proposed Action with Conservation Measures

The effects, on the visual resource, of implementation of this alternative would be essentially identical to the effects of Alternative 2. There would be no significant positive or negative impacts on visual resources as a result of implementation of this alternative.

Alternative 4: Proposed Action with No Summer Timber Harvesting

The effects, on the visual resource, of implementation of this alternative would be essentially identical to the effects of Alternative 2. There would be no significant positive or negative impacts on visual resources as a result of implementation of this alternative.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

The effects, on the visual resource, of implementation of this alternative would be essentially identical to the effects of Alternative 2. There would be no significant positive or negative impacts on visual resources as a result of implementation of this alternative.

Cumulative Effects

There will be no significant direct or indirect effects on visual resources as a result of implementation of any of the alternatives. Minor, short-term effects on individual projects are very similar to effects resulting from routine resource coordination. There are no present or reasonably foreseeable future effects that will result from these actions.

Recommended Mitigations for Visual Resource Management

The following additional change in the current Forest Plan is recommended if one of the Alternatives 2 through 5 is chosen.

The snag retention components of the Terms and Conditions are in conflict with specific standards and guidelines for visual resource management in the Forest Plan. The chart on page 4.51 of the Forest Plan, titled "Timber Harvesting and Visual Conditions", identifies " Additional Requirements Exceeding Standard Practice for Snags, Leave Trees and Other Contrasting Elements." In several places in this column, are listed the following standards: "Snags which dominate the surroundings will be removed", as well as "Trees which do not appear typical of openings will not be left", and "Snags which dominate the opening will be removed". There is a strong possibility that any of these snags will meet some of the requirements for snag retention under these alternatives, so simple removal isn't possible, as these standards suggest. It is proposed these statements be deleted and replaced with the following guidelines inserted into a revised chart in the Forest Plan on page 4.51.

- ✍✍**"Snags which dominate the surroundings may be removed after consultation with the Forest Wildlife Biologist."**

- ✍✍**"Trees which do not appear typical of openings may be removed after consultation with the Forest Wildlife Biologist."**

- ✍✍**"Snags which dominate the opening may be removed after consultation with the Forest Wildlife Biologist."**

Roads

Affected Environment

There are approximately 795 miles of roads (excluding the Taconic proclamation boundary) within the proclamation boundary of the GMNF, not all of which are National Forest roads. State, town, and privately owned or regulated roads constitute 659 miles of the total road miles.

Road management on the GMNF gives priority to building and restoring roads to solve environmental problems on existing roads as well as provide public access to areas of the GMNF surrounded by private lands. The lowest priority is given to building roads solely needed to accommodate vegetative management practices or to roads that might foreclose the option of increasing future backcountry recreation opportunities. Road construction and reconstruction has focused on remedying problems that need to be fixed for recreation purposes and for vegetation management. The GMNF strives to maintain over 285 miles of roads per year in order to provide safe public use and prevent road damage, a goal achieved by approximately 70%.

It was projected that a total of 40 miles of road construction and reconstruction were needed to meet the long-term goals and objectives of the Forest Plan. Out of the 40-mile long-term total, 5 miles were scheduled for construction in the next ten years. The decision was also made to design and manage new roads to minimize construction cost. This meant that most new roads would be opened to vehicles only when seasonal conditions allowed.

Given that the GMNF road's program has been financed at approximately 36% of the Forest Plan's projected budget, the Forest has done well in meeting its goals for road restoration, construction, and reconstruction. Since the Forest Plan was approved, we have restored 17.7 miles of roads, reconstructed 8.3 and constructed 5.8.

Direct, Indirect, and Cumulative Effects

The direct, indirect and cumulative effects of any of the alternatives are expected to be minimal based upon the small amount of new road construction planned during the current planning period. Any new road construction will be planned, designed, and located to avoid suitable roost trees and openings to the maximum extent possible. Routine maintenance and brushing will have no effect on roost trees or openings. Any brushing/clearing that may involve larger trees will be mitigated to avoid disturbance to potential habitat.

It is unlikely that the update of the RFSS List will have any significant effect on the road management program. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For road management, this is expected to be of minimal impact.

Fire

Affected Environment

Generally, montane forests in this region lack significant fire regimes. An exception is in the northwest and southwest part of GMNF. In the northwest, where the Green Mountains meet the Champlain Valley, fire is documented as a disturbance regime. This is due to the exposure of the landscape to eastward moving fronts passing through the Champlain Valley. In the southwest part of the forest, along the Taconic Mountain Range, the oak-hardwood forests and some woodlands along mid slopes, show evidence that fire may have been common.

Historically, disturbances that ranged from large blowdowns (e.g. hurricanes) to single tree gaps, created interior forest openings. These interior forest openings have been shown to be extremely important to a majority of wildlife species inhabiting the forest. Currently, prescribed fire is being effectively used to create and maintain these interior forest openings, blueberry fields, historic cultural sites such as homesteads and farm fields, and to reduce hazardous fuel buildups along important forest roads and near buildings.

The Forest Plan anticipates that approximately 725 acres of "wildlife" habitat maintenance will occur annually (e.g., upland opening maintenance, orchard pruning and release), while an average of 40 acres/year of habitat improvement (e.g., opening creation) will occur. Since 1987, prescribed fire has been used to create and maintain these wildlife habitats at an annual rate less than anticipated. Between 1987 and 1996, an average of 260 acres of wildlife openings were treated with prescribed fire annually (USDA 1999).

Over the next 5 years, use of prescribed fire is expected to increase to between 600-700 acres per year on GMNF. This is response to a national direction to use fire as a tool to reduce hazardous fuels near structures and also to use fire in restoring ecosystems.

Direct, Indirect and Cumulative Effects

Alternative 1: No Action

There would be no change in existing Forest Plan direction under this alternative. Fire would continue to be used as a tool to treat activity fuels and maintain openings.

All Other Action Alternatives

In order to minimize the potential effects of smoke on occupied Indiana bat hibernacula or roosting bats during fall swarming, all action alternatives would:

1. Consider occupied Indiana bat hibernacula as smoke-sensitive areas when planning for prescribed burns to be conducted from October to May 1.

2. Prior to the employment of any prescribe fire, provide the FWS with the opportunity to review burn plans that could potentially affect Indiana bats.

Prescribed fire within the 5 mile zone of influence is not expected to lead to any changes in direct, indirect or cumulative impacts on the fire management program. Fire planning that considers season of burning, wind direction, speed, smoke mixing height, and transport winds would minimize the drifting of smoke in or near occupied hibernacula.

The reservation of trees to minimize the likelihood of a take regarding Indiana Bat would not lead to any changes in direct, indirect or cumulative impacts on the fire management program. Prescribed fire is usually used to maintain openings and blueberry fields, where trees are not present. These standards would not apply during the suppression of wildfires, where the overriding objectives are public and firefighter safety and minimizing the amount of acreage burned.

The listing of current RFSS has no impact on the fire program. It does not change any standards, guidelines or effects. The protection of discovered sites while site specific site plans are devised may

lead to the cancellation or delay of specific burning projects. The impact of site-specific conservation plans is unknown.

Fisheries and Aquatics

Affected Environment

The affected environment for the fisheries and aquatic resources consists of all GMNF lands. The Forest contains over 550 miles of streams and rivers. All are managed in cooperation with the Vermont Department of Fish and Wildlife as coldwater fisheries habitat. There is limited trout stocking in GMNF streams and rivers as most perennial streams support self-sustaining populations of trout, albeit, at varying levels based on habitat quantity, quality and other factors. However, stocking does occur where insufficient numbers of catchable-sized trout are naturally produced.

Cooperative Atlantic Salmon restoration efforts continue in the Connecticut River watershed. Approximately 110 miles of salmon habitat occurs within the Forest. Fry stocking occurs on an annual basis in many of these waters.

There are many ponds, lakes and reservoirs within the Forest and its proclamation boundary. Most of these are managed as coldwater fisheries but a few contain warmwater fisheries. Many of the ponds are stocked with trout as natural production is inadequate to maintain quality fishing or fishing pressure exceeds the capability of the pond to produce enough catchable-sized trout.

Stream habitat restoration and aquatic habitat enhancement have occurred within several watersheds on the Forest. Native species habitat requirements, channel geomorphology, stream hydrology and riparian habitat conditions are evaluated as part of restoration activities. Projects generally involve the placement of large diameter trees (most frequently hemlock but spruce and pine have also been used) and/or boulders within the stream channel and along its banks for a myriad of reasons such as increasing habitat diversity and complexity and reducing stream sedimentation. In most cases live, green standing trees are pushed over or cut and hauled in from nearby upland areas away from the immediate streambank. Generally no more than a few acres of forest are impacted for each fish project. Trees are generally removed from sites in late June to early September before stream work occurs. The Forest has many partners and collaborators involved in stream habitat and fisheries, and watershed restoration work. We plan to continue this type of work in future years.

Direct and Indirect Effects

Alternative 1: No Action

This action would have no effects on fisheries resources, Atlantic salmon restoration, trout stocking programs, or stream habitat restoration projects.

Alternative 2: Proposed Action

This alternative would have no effect on fish stocking programs or Atlantic salmon restoration. Based on past experience, TES species protection could change the timing, extent, or location of some stream habitat restoration and fisheries enhancement projects. Specifically, these projects could be impacted by TES species protection measures when trees need to be cut or when RFSS populations

need to be avoided. However, the impacts of TES species protection and conservation on these projects would be minor and could be minimized by the fact that live softwood trees are used. These trees do not generally exhibit the characteristics preferred by Indiana bats as nesting and rearing habitat. Also, where site specific protection measures are necessary, the timing of tree cutting could be delayed to the hibernation period of August 31 to May 14th, except near known hibernacula where cutting could occur between November 1 and May 14th. The protection of snags along riparian areas would potentially allow more recruitment of woody debris into the stream ecosystem.

It is unlikely that the update of the RFSS list will have any significant effect on fisheries resources or fisheries management programs. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For fisheries management, this is expected to be of minimal impact.

Alternative 3: Proposed Action with Conservation Measures

The effects would be the same as for the Proposed Action.

Alternative 4: Proposed Action with No Summer Harvesting

The effects to fisheries and stream habitat restoration projects would be similar as in the Proposed Action. In addition, tree removal for fisheries and stream habitat restoration projects would occur separately from timber sale units during the summer months.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

The effects to fisheries and aquatic resources would be the same as for Alternative 4.

Cumulative Effects

The cumulative, forest-wide effects on fisheries and aquatic resource protection and management of implementing any of the alternatives would be minor. This is because trees preferred for aquatic resource management and the time of year they are needed would not adversely impact TES species protection and conservation.

Real Estate Management

Affected Environment

The total area within the boundaries of the GMNF is 815,000 acres. To date, approximately 375,300 acres have been purchased by the United States for national forest purposes. The majority of these lands were acquired via direct purchase with occasional parcels being added by exchange and donations. Nearly all acquisition has been on a willing seller - willing buyer basis with the seller coming forward with offers to sell to the U.S. The largest percentage of federal ownership is forestland along the spine of the Green Mountain Range.

The north half of the forest contains several blocks of federal ownership with a number of private ownerships throughout.

On the southern half of the forest the federal land is fairly consolidated with some scattered private ownership. The expansion of the national forest boundary in 1991 to include the Taconic Mountain Range provided an opportunity to expand national forest ownership in this area.

Land adjustment goals are outlined in our Forest Plan and include; consolidation of ownership, protection of existing national forest values, protection of soil and water, wildlife habitat improvement, public access, special areas and dispersed recreation. These goals can be accomplished with direct purchase, exchange, or donation.

Direct and Indirect Effects

Alternative 1: No Action

There would be no effects to the land adjustment program under this alternative.

Alternative 2: Proposed Action

Under this alternative, the existing Forest Plan would be amended to incorporate the Terms and Conditions of the BO.

Protection of Den Trees, Roost Trees, Hibernacula, and Maternity Sites - Acquisition of lands containing any of these sites would be considered a priority under the existing goals in our Forest Plan. All land adjustments involving the disposal of NFS land require environmental analysis, including an evaluation of the effects of the exchange on threatened, endangered and sensitive species.

There would be no effects on the land adjustment program from any of the RFSS updates or other standards and guidelines added to the Forest Plan under this alternative.

Alternative 3: Proposed Action with Conservation Measures

In addition to the Proposed Action described above, this alternative includes conservation measures that would benefit Indiana bat habitat and habitats for other woodland bat species. It would also increase monitoring for bats and bat habitat as well as increase Education and Outreach efforts related to Indiana Bat conservation.

Protection of Den Trees, Roost Trees, Hibernacula, and Maternity Sites - Acquisition of lands containing any of these sites would be considered a priority under the existing goals in our Forest Plan. All land adjustments involving the disposal of NFS land require environmental analysis, including an evaluation of the effects of the exchange on threatened, endangered and sensitive species.

There would be no effects on the land adjustment program from any of the RFSS updates or other standards and guidelines added to the Forest Plan under this alternative.

Alternative 4: Proposed Action with No Summer Timber Harvesting

This alternative replaces terms and conditions related to summer timber harvesting by discontinuing timber harvesting during the non-hibernation period (May 15 – August 30). With no "summer"

harvesting two standards & guidelines outlined in the Proposed Action were eliminated as they apply to the non-hibernation season. All other components of Alternative 4 remain the same as described in the Proposed Action.

Protection of Den Trees, Roost Trees, Hibernacula, and Maternity Sites - Acquisition of lands containing any of these sites would be considered a priority under the existing goals in our Forest Plan. All land adjustments involving the disposal of NFS land require environmental analysis, including an evaluation of the effects of the exchange on threatened, endangered or sensitive species.

There would be no effects on the land adjustment program from any of the RFSS updates or other standards and guidelines added to the Forest Plan under this alternative.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

This alternative combines Alternative 3 and 4. Standards & guidelines and general direction would be as described in these two alternatives.

Protection of Den Trees, Roost Trees, Hibernacula, and Maternity Sites - Acquisition of lands containing any of these sites would be considered a priority under the existing goals in our Forest Plan. All land adjustments involving the disposal of NFS land require environmental analysis, including an evaluation of the effects of the exchange on threatened, endangered or sensitive species.

There would be no effects on the land adjustment program from any of the RFSS updates or other standards and guidelines added to the Forest Plan under this alternative.

Cumulative Effects

There are no direct effects on the lands adjustment program from Alternative 1. The only direct effect to the lands adjustment program as a result of Alternatives 2 – 5 is that NFS lands within the areas of influence would probably not be available for exchange. This currently amounts to 13,430 acres, combined with an additional 89,000 acres of previous Forest Plan designations (wilderness and other special areas designation) of Forest Lands, which would be unavailable for exchange. Given that the extent of the exchange program is limited to occasional parcels, the cumulative effects of any alternative would be minimal. Those private lands within the areas of influence would be considered a high priority for purchase if they were offered for sale and were within the existing National Forest boundary. Should additional areas of influence be established, a separate analysis will occur at that time to assess any impacts to the land adjustment program.

Special Uses Management

Affected Environment

All uses of NFS land by other entities, public or private, except those pertaining to minerals, grazing, forest products, or personal recreation use, are called Special Uses. Such uses require an authorization called a Special Use Permit. The GMNF has about 250 Special Uses including roads providing access to private land, water systems, utility lines, and communication sites. Many of these uses are ground

disturbing during construction, and some require maintenance that also may result in ground disturbance. Virtually all Special Use Permits require the permittee to monitor the area under permit for hazard trees, and to obtain permission from the appropriate Forest Service officer to remove them. Utility lines and roads are the primary uses requiring clear corridors that must be kept safe from hazards on a routine basis.

These uses occur throughout the Forest. Proximity to hibernacula, roost trees, or maternity sites is possible if continued monitoring discovers more.

Applications for new uses are reviewed for compatibility with the Forest Plan. If compatible with the Forest Plan, they go through an environmental review process that includes a biological evaluation.

Direct and Indirect Effects

Alternative 1: No Action

While individual uses will undergo a case-specific examination, this alternative does not include the development of programmatic direction in the form of standards and guidelines in the Forest Plan, which would be a requirement in facilitating that examination. Beyond that, this alternative would not change current Special Use management practice and, therefore, would have no effect on Special Uses.

Alternative 2: Proposed Action

Proposed uses that require tree removal may require minor relocation or adjustments to the timing of the cutting. Just as in the "Recreation Resource" section, timing of hazard tree removal may have to be adjusted. These should be small changes of little negative effect to most uses.

Uses near hibernacula, roost trees, or maternity sites may be affected by the resulting management strategy developed cooperatively by the Forest Service, FWS, and the Vermont Department of Fish and Wildlife. The effect of this unknown on the management of the use cannot be quantified at this time.

It is unlikely that the update of the RFSS List will have any significant effect on special uses or management of such uses. Since we are already required to complete environmental reviews, including biological evaluations, the updating of the RFSS list is not a change from current procedures. The increased number of species on the list that need to be considered in reviews could increase the number of new projects that need to be adjusted or mitigated. For special use management, this is expected to be of minimal impact.

Alternative 3: Proposed Action with Conservation Measures

Effects under this alternative should be similar to Alternative 2 above.

Alternative 4: Proposed Action with No Summer Timber Harvesting

This alternative may affect Special Use management to the extent winter-only logging requires trucks to be using roads also designated as snowmobile trails. Some snowmobile trails are used under Special Use Permit by outfitter guides or for recreation events. Situations such as those described under the "Recreation Resource" section, where there is no good alternative snowmobile trail, should

not occur as frequently with the small number of winter permittees, because they do not use all the roads where such conflicts are likely to occur. Other existing trails, perhaps in a different part of the Forest, may need to be used. Overall, the effect should be minimal.

Alternative 5: Proposed Action with Conservation Measures and No Summer Timber Harvesting

Effects under this alternative should be similar to Alternative 4 above.

Cumulative Effects

The known effects on the management of Special Uses of implementing any of these alternatives would be minor. Only minor relocations to avoid specific kinds of potential habitat trees and adjustments in the timing of hazard tree removal are foreseen. Winter Special Uses may be affected under Alternatives 4 and 5 if roads normally used as trails by permittees are to be used for log haul and there is no suitable alternative. Therefore, the overall cumulative effects of implementing any of the alternatives are anticipated to be minor.

Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Population and Low-income Populations," mandates that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, policies, and activities on minority populations and low-income populations," (Federal Order 12898, 2/11/94). Evidence shows that areas of low income or minority populations suffer a disproportionate risk of succumbing to adverse environmental conditions in their community. Some examples of this problem include toxic waste facilities, garbage disposal areas, or unmonitored factory dumping in impoverished, ethnic areas. In order to protect the rights and health of these populations, this Executive Order establishes, within the NEPA framework, a system to analyze the demographics of a proposed location.

Before a policy or proposal is instated, the proposed area must be checked to see whether it will disproportionately affect minority or low-income populations. The standards used to analyze a given location are as follows: if the demographics of a proposed location show a minority or low-income population greater than two times that of the state average, then that area is considered one of potential environmental injustice. If the demographics of a proposed location show a minority or low-income population greater, but not two times greater than the state average and there are community-identified environmental justice related issues, the case should be identified and addressed as a potential environmental justice case. If the demographics of a proposed location demonstrate minority or low-income populations is equal to or less than that of the state average, then the area is not considered a potential for environmental injustice and there is no reason to disregard the proposal due to ethnic or financial discrimination.

Green Mountain National Forest Counties

The following tables compare the ethnic and income demographics for the counties within the Green Mountain National Forest to the Vermont state averages.

Table 13. Ethnic demographics for the Green Mountain National Forest region[a].

County	%Native American	% African American	% Asian	% Hispanic
Addison	0.2	0.7	1	1
Bennington	0.1	0.5	0.8	0.9
Essex	0.3	0.2	0.2	0.6
Rutland	0.1	0.4	0.6	0.6
Washington	0.2	0.5	0.7	1.6
Windham	0.1	0.8	1	1
Windsor	0.2	0.4	0.8	0.7
Vermont State Average	**0.3**	**0.6**	**0.9**	**1**

[a]U.S. Bureau of the Census. 1998. U.S. Counties 1998. Available at http://govinfo.library.orst.edu. October 30, 2000.

The above display shows that none of the counties analyzed demonstrate ethnic populations greater than two times that of the state average. The % Native American population in Essex County is equal to the state average, as is the % Hispanic in Addison and Windham counties. In Addison and Windham counties, the % African American and the % Asian American are greater (but not two times greater) than the state average.

Table 14. Income demographics for the Green Mountain National Forest region[a].

County	% Below Poverty Level
Addison	12.2
Bennington	12.7
Essex	15.1
Rutland	12.7
Washington	11.2
Windham	12.1
Windsor	11.3
Vermont State Average	**12.2**

[a]U.S. Bureau of the Census. 1998. U.S. Counties 1998. Available at http://govinfo.library.orst.edu. October 30, 2000.

The counties analyzed in Table 14 above do not portray income percentages greater than two times the state average. In Bennington, Essex, and Rutland counties, the income percentages are greater, but not two times greater than the state average.

In conclusion, the counties within the Green Mountain National Forest do not demonstrate ethnic nor income demographics two times greater than that of the state average. Most importantly, the proposed action and alternatives do not pose a disproportionately high and adverse environmental, human health, or social effect on these counties, and there are no known community identified environmental justice related issues. The intensity of economic impacts to individual vendors in Addision and Bennington Counties if Alternative 4 or 5 were chosen is difficult to determine. If either of these alternatives were chosen, this would need to be examined more closely. The above conclusions are based on the effects contained in other portions of this Environmental Effects Section.

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